DOCUMENT RESUME

ED 196 561 PS 011 934

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TITLE A Guide to Creative Playground Development.
INSTITUTION Ontario Ministry of Culture and Recreation, Toronto.
PUB DATE 79
NOTE 107p.

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Children; Climate; Facility Guidelines; *Facility Planning; Facility Requirements; Landscaping; Outdoor Activities; Playground Activities; *Playgrounds; Safety; *Site Development; *Site Selection; Vandalism

ABSTRACT

This booklet provides non-professionals with the guidelines, information, and procedures necessary to design, plan and build stimulating outdoor play environments for children. Information on technical issues related to site selection, play area design, landform and drainage, climate, lighting, safety and vandalism are provided in Chapter I. Chapter II presents instructions (both written and diagrammatic forms) on how to build from both recycled and new construction materials a variety of playground equipment (for example, a group swing, a bouncing net and an amphitheatre). Chapter III describes ways in which plants, if properly used, can make a valuable contribution to the playground. Chapter IV presents plan drawings of three prototypical playgrounds in order to illustrate how the design process of playground planning is dependent upon three basic considerations: (1) the goals and themes of the playground program; (2) the physical conditions and requirements of the chosen playground site; and (3) the conceptual organization necessary to produce a final plan for a playground design. A schedule of cost estimates for various playground materials along with technical data and other information of relevance to planning and designing a playground are appended. (Author/MP)

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a guide to

CREATIVE PLAYGROUND DEVELOPMENT

United Nations Declaration of the Rights of The Child

The right to affection, love and understanding. The right to adequate nutrition and medical care. The right to free education. The right to full opportunity for play and recreation. The right to a name and nationality. The right to special care, if handicapped. The right to be among the first to receive relief in times of disaster. The right to learn to be a useful member of society and to develop individual abilities. The right to be brought up in a spirit of peace and universal brotherhood. The right to enjoy these rights, regardless of race, color, sex, religion, national or social origin.

Material prepared by:
Paul Chu and Alex Topps

Ontario Ministry of Culture and Recreation
Special Services Branch
Hon. Reuben C. Baetz
Minister
Douglas Wright
Deputy Minister

INTRODUCTION

The intent of this booklet is to provide information and procedures related to the design, planning and building of stimulating outdoor play environments by non-professional people. This handbook will focus in on creative playgrounds and concentrate on a discussion of the following areas: site planning principles, playscape ideas and materials, landscaping and use of plant materials, and, a schedule of materials and costs. Several prototypical concept cases will be developed in order to distill the foregoing information graphically and provide a fuller appreciation of the character and content of a challenging play environment.

site planning principles:

Material in this chapter will provide information on technical issues related to site selection, circulation, landform and drainage, climate, lighting, safety and vandalism.

playscape ideas and materials:

This chapter presents alternative ways of providing playscapes to accommodate children's play activities. Innovative ideas accompanied by technical design drawings are presented using various recycled and new construction materials. Facilities for play of a contemplative or creative character as well as those for strictly physical play will be discussed.

landscaping and plant materials:

This chapter describes the ways in which plant materials if properly used can make a valuable contribution to the playground. This material will also elaborate on the use, selection and preserving of trees and shrubs on the play areas.

demonstration cases:

This chapter will attempt to illustrate certain design principles and the organization of functions and form through plan drawings of three prototypical playgrounds. It is hoped that these cases will represent an application and synthesis of the foregoing material.

cost estimating:

Appendix A will present a schedule of cost estimates for various materials often used in building a playground

technical data:

Appendix B houses technical data and information referred to in the text of this booklet.

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CHAPTER ONE

Site Planning Principles

site selection

circulation

landform & drainage

climate

lighting

safety

vandalism

SITE SELECTION

The site selection process, the first crucial step in the design of the playground, is vital to its future success. The playground should not necessarily be constructed on the first piece of available land, nor should the site be utilized in an arbitrary fashion. The aim of the following section is to assist the designer or the playground committee in the basic fundamentals of site selection so that the final location truly satisfies the needs and matches the behaviour of the neighbourhood children. It is also intended to provide insights into the various artifacts and features of the site that if sensitively combined with the play function will greatly enhance the excitement and learning potential of the playground.

The designers must be prepared to enquire into the following general categories of information relative to the playground and the community, the location of the playground in the neighbourhood, physical features of the site, capital cost and maintenance, local sources of land and support, character of the user group.

location of playground in neighbourhood:

The *distance* a child will travel from his home without supervision is a direct function of age. Hence, those locating potential sites must be thoroughly acquainted with the composition of the community and the effective mobility of the children whose needs are to be served. The community must be viewed the way the child sees it.

For example, a playground intended for heavy use by pre-school children will be sparsely attended and resented by parents, regardless of thoughtful design and innovative equipment, if it is located too far from home. However, if this must be the case, the design should make provision for adults to take their children to the playground. Therefore, the potential site for this type of playground would be able to comfortably accommodate adults in an attractive location overlooking the activities.

Access is another important issue. Although the site may be within walking distance for the child, access to it may be interrupted by such things as heavily travelled streets, industrial activity, underpasses and railway tracks. These should all be clearly plotted on a base diagram of the neighbourhood to give a clear impression of the obstacles a child may encounter.

Supervision is an important concern for parents and children. The ease with which the site can be casually supervised by responsible adults must be considered. If portions of the playground are easily overlooked by passers-by or if it is under the watchful eye of a sympathetic local shopkeeper, it may be more readily accepted into some communities. However, attractive sites should not necessarily be discarded because they are not completely exposed. A candid assessment of the neighbourhood and the sentiments of the parents will determine the importance of this issue.

The playground *location* should also respect the children's established terrain. It should be located where the child likes it to be — where he or she feels comfortable. Participation by the children in the evaluation process and a thorough research of their habits will provide valuable insights into the suitability of various sites.

The proximity of complimentary or conflicting playground facilities is another factor affecting location. The proposed playground may duplicate already existing facilities or fail to utilize play resources available in other parts of the neighbourhood. Nearby play equipment should be inventoried and evaluated before the site is selected or the design finalized. Many traditional pieces of equipment can become an integral component of a creative playground.

Knowledge of the character of the surroundings and the type of land-use adjacent to the proposed site is also pertinent. If houses adjoin the playground site the designers should solicit the support of these property owners at the outset. Finally, they should consider the requirements of specialized land-uses in the area such as nursing homes, libraries, and residences for the aged where conflict is likely.

site — physical features:

The presence of stimulating natural elements such as streams, rock outcrops, ponds, marshes, forest cover and brush, on or adjacent to the site, increases its attractiveness while enhancing its learning and play potential.

Sites with surroundings such as these should rank high on the list of potential locations. Ravines can support such activities as tobogganing in winter and rope slides in summer; streams, ponds and marshes provide adventure and the opportunity for nature study; mature trees are ideal for swings and tree forts, while a forest can become a cave, cathedral or kingdom in the imagination of the child.

Nevertheless, the desirability of these sites should be balanced against concerns for child safety, the requirements of the local ecology and possible higher maintenance and construction cost. Funds may be necessary at the outset to clear dead limbs from trees, stabilize slopes and protect sensitive ecological areas. Preferably, playgrounds should only be constructed in an area where the ecology is a very durable one.

Slopes have a bearing on the suitability of the site because of peculiarities of the micro-climate. Many north-facing slopes are colder in winter than corresponding south east or west facing ones. While this may be ideal for tobogganing, because snow accumulates to greater depths and tends to be retained longer into the spring, the lower temperatures may inhibit other winter-time activities. Locations at the foot of slopes often tend to collect frost and hence may be less inviting in certain periods.

capital cost and maintenance:

While it is impossible to predict accurately the maintenance and capital cost burden associated with a potential site, the designers should investi-

gate such things as ease of vehicular access, costs for demolition and site clearance and service outlets, all of which can consume large portions of a limited budget. It may be necessary to trade-off site amenities with costs for facilities and equipment.

sources of land and support:

It is not always necessary for the group promoting the design and construction of the playground to accept the first piece of land that becomes available, nor is it always imperative that they own the land. A resourceful playground committee may acquire access to desirable sites by approaching government and private institutions with large land holdings in the community. They are often eager to participate with a responsible community group in such a venture.

Control of many of the most appropriate sites for playgrounds is typically held by local parks and recreation department or the board of education. A significant inventory of playgrounds now exist in the province that have been built and maintained jointly by these agencies and local community committees. As this practice is likely to continue, representatives of the playground committee should express the group's interest and initiative to these agencies as early as possible.

These are not the only sources of publicly held land that may be available. Hydro easements, abandoned railways, properties bordering water filtration and sewage treatment plants, vacant land acquired by the municipality for back taxes and flood plain lands controlled by the local conservation authority should all be investigated. An examination of a local land use map may provide valuable insights into alternative locations.

Private parks surrounding regional office headquarters, research facilities, building set-backs and vacant land held for future use by development companies often comprise a significant portion of the available land in suburban areas. Many of these corportions and individuals are conscious of their role in the community and will be willing to donate or loan space for use as a playground. They will likely require that the playground committee acquire public liability insurance, which is neither difficult to obtain nor expensive. These corporations often demonstrate a willingness to assume the complete costs and responsibility for maintenance and control.

character of the user group:

While parents may be sensitive to the need for play facilities in the neighbourhood, they should also be well informed of the character, personality and composition of the group they are providing for.

No playground should be undertaken without a thorough understanding of such things as: the relative ages of the children, their personal preferences and habits, their distribution within the neighbourhood, and their ethnic background.

The design committee should also look to the future by selecting a site that has the potential to grow with the children, allowing flexibility of activities, continual change and constant addition of facilities in subsequent years.

It should be emphasized that the playground should not be planned and built in a vacuum. Only if it is a co-operative venture with parents, children, teachers, local businessmen — in fact, the entire community supporting and participating equally is the playground assured of success.

CIRCULATION

The circulation system can be designed to control the desired internal relationships of spaces and activities, ensure proper care of specific site features and relate the playground in a functional manner to its surrounding. The design process logically begins with circulation and therefore various aspects of circulation which influence the layout of the playground will be discussed and illustrated.

play activities:

Movement is primary to the concept of creative playgrounds. A well designed circulation system must easily accommodate a variety of pedestrian needs ranging from the simple requirements of small groups of children running, skipping and climbing to the more complex problems of group activities — both passive and active.

The design must also consider a variety of mechanical devices related to play and the normal day to day functioning of the playground such as roller skates, bicycles, soap-box derbies and baby carriages.

Finally, the circulation must also be designed to permit occasional access by vehicles. This may include such things as craft and drama caravans and bookmobiles, which are important adjuncts to playground activities, but also involves the movement of construction and maintenance vehicles.

desire lines:

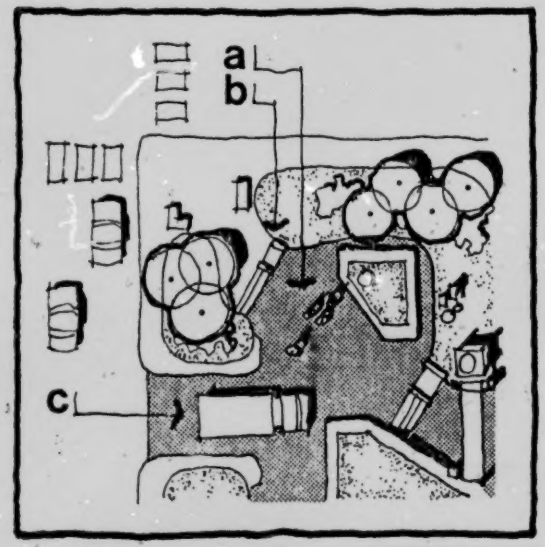
Most potential playground sites have an existing pattern of movement that have been established over time by circulation across the area to destinations around the perimeter. While movement on these paths may have been of sufficient magnitude to warrant hard surfacing with asphalt or concrete, it is more commonly evidenced by simple dirt tracks worn in the grass.

These paths, known as desire lines, are the basic resource from which the circulation concept is developed. A desire line usually represents the shortest distance or the easiest route between two points. With care the existing desire lines can be modified slightly, however, they are extremely difficult to block or eliminate. All known and projected desire lines should be plotted on an accurate base drawing before new circulation patterns are established.

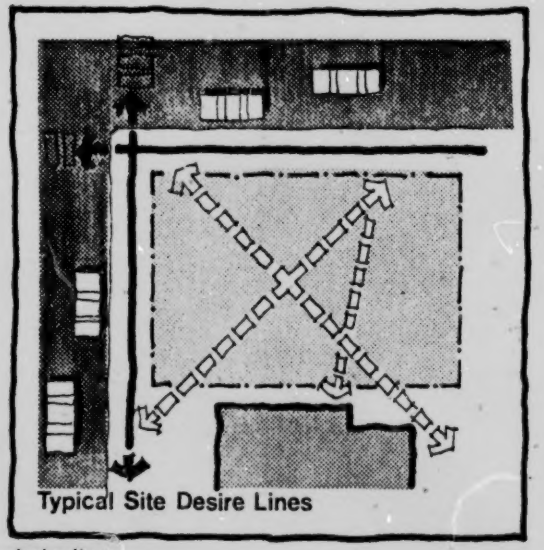
A. Continuous paved pedestrian system linking all playground areas

B. Ramps for bicycles, wagons and wheelchairs

C. Controlled service and vehicular access



play activities



desire lines

topography and vegetation

topography and vegetation:

Pedestrian movement usually responds to land form by seeking the line of least resistance. For example people would move along the lowest plane in the landscape, and prefer to negotiate grade changes with a minimum of effort, moving across slopes rather than straight up or down.

Circulation around existing vegetation, especially that requiring hard surfacing, should be kept to a minimum. It is very important to have the locations of existing trees accurately plotted on a base drawing before finalizing the circulation concept.

Circulation systems laid out in an arbitrary fashion will not be respected by the children who use the playground. Pathways that correspond to their preferred patterns of movement particularly at access points will: keep the playground tidier; protect the trees, shrubs and grass; and minimize maintenance expenses.

pedestrian access:

Most creative playgrounds benefit from multiple access points. This permits easy entry to the site from various approaches, allows timid children a variety of choices, and facilitates the orientation of specific activity areas to the surroundings.

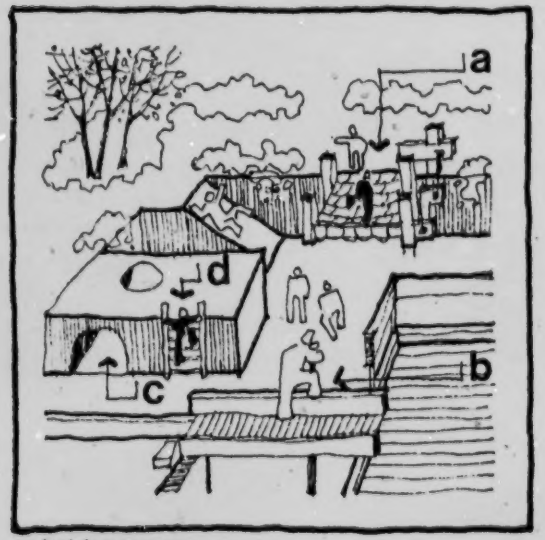
The design of entry to specific parts of the playground can be handled to reinforce the child's feeling of belonging and security in an area designed for his age group. For example the entry to a totlot or pre-school area can be scaled down to match the small body size of the young child, while access to an area for older, stronger, more agile children can be made more intriguing if it is constructed in the form of an obstacle such as a palisade or climbing structure.

entry devices

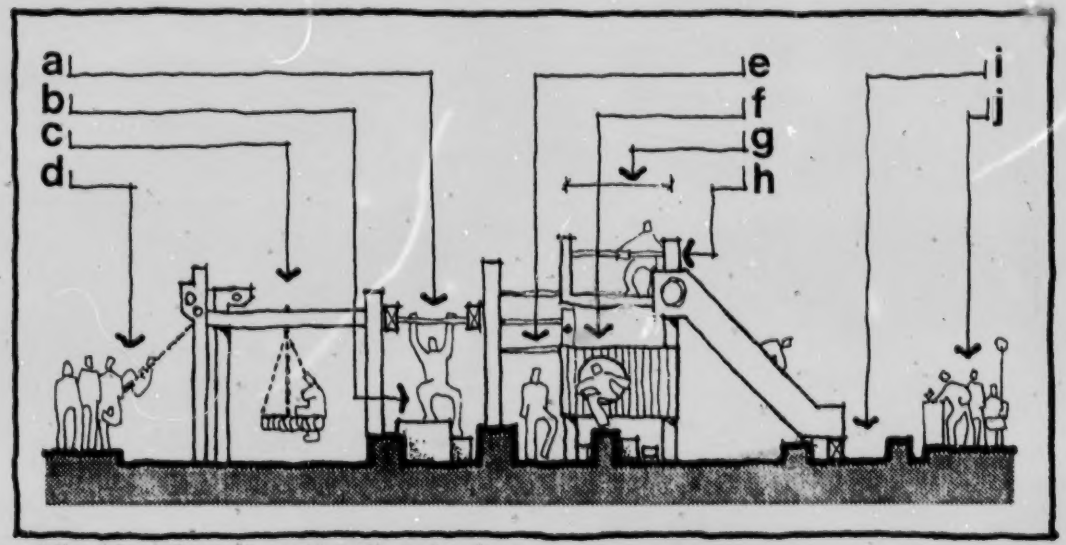
A. Cargo net structure
B. Fireman's pole entry
C. Tunnel and slide entry
D. Ladder entry

dimensions and placements

A. Grasping heights — scaled to age and size of children
B. Stepping heights
C. Lateral movement of tire swings should not contact upright supports
D. Avoid conflict of swinging devices with pedestrian movement
E. Ensure adequate head clearance
F. Ample dimensions of openings
G. Raised areas should be wide enough to allow balancing
H. Sturdy handrails on raised platforms
I. Avoid objects too close to bottom of slide
J. Widen path at gathering points



pedestrian access



relationship of play equipment to paths and surfaces

vehicle access:

Demonstrations of fire fighting equipment, ambulances, the arrival of the bookmobile and periodic visits by craft or drama displays, are all typical examples of playground activities that are better served if vehicles can gain access to a portion of the site. Routine maintenance and future construction activities should also be considered in the circulation concept.

On quiet residential streets vehicles may be accommodated adequately at the curb or in simple drop-off areas. In other neighbourhoods where it is advisable to discourage gatherings of children at the edge of heavily travelled streets it may be possible to use an adjacent parking lot. If this is not feasible one entry path should be constructed to tolerate heavier loads. Ideally playgrounds should be designed with a path of sufficient length and width to allow a normal truck to gain access to a group gathering area where seating is provided and there is ample room for pedestrian movement around the vehicle.

control of vehicles:

Control of vehicular access can often be a problem. The layout of the circulation system should not present an invitation to irresponsible entry into the site by cars, motorcycles or all terrain vehicles. The best method to prevent undesirable vehicular circulation through the site is by introducing level changes i.e. steps, or by constricting the width of the path. Bollards and gates are alternative solutions but tend to be less convenient because keys are required for access by service and emergency vehicles.

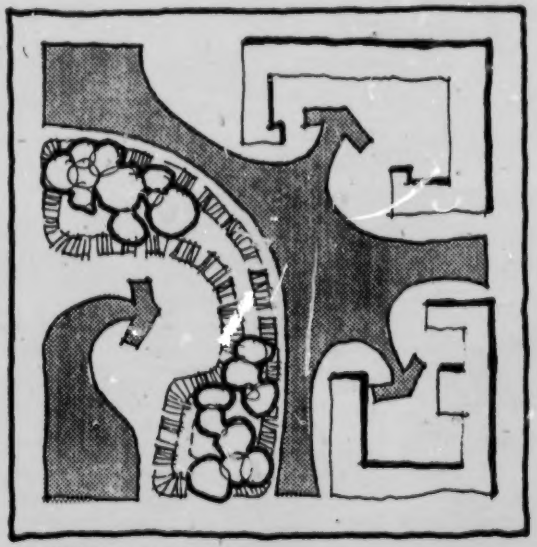
relationship of play equipment to paths and surfaces:

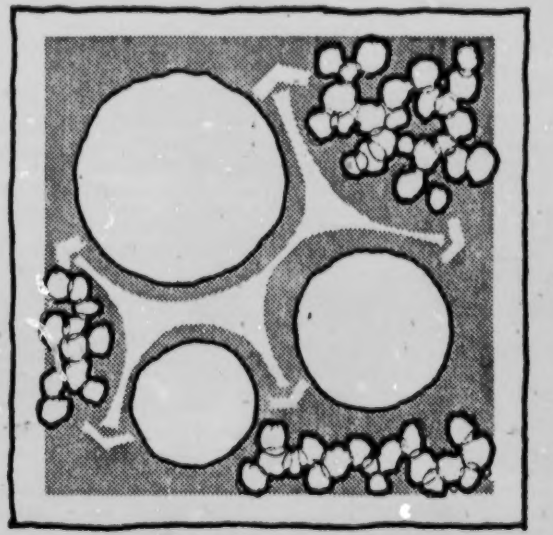
Greater path widths are recommended wherever clustering of children is likely to occur. Hence, collectors such as water taps, drinking fountains and line-up points for equipment should be adequately spaced and carefully arranged along the edge of the path to facilitate uninterrupted circulation. Play equipment which generates uncontrolled movement must be placed well back from curb edges and paths. It is imperative to locate swings, slides and other dynamic devices so as to avoid conflict with traffic and stationary objects.

In areas of densely placed equipment it is wise to use a continuous ground cover of soft materials such as sand, woodchips or bark and edge the area with an asphalt or concrete surface that will contain the loose material and provide a safe refuge space for the child.

circulation concepts:

Circulation systems can control behaviour in the playground to a limited extent. If sharp division by age of participants is desired, multiple access points and segregated circulation systems are often useful. On the other hand if activities are not to be segregated and contact between various age groups is desired, a continuous series of loops and an integrated pattern of movement will be more satisfactory. The accompanying illustrations provide a range of conceptual relationships relating to various activity layouts and movement patterns.





circulation concepts

LANDFORM AND DRAINAGE

Level changes and topographic variations represent a significant asset to any play environment. The designer should be aware of the various functions of landform — the ways in which it can be used to control internal organization, achieve visual effect and stimulate play activites.

He should anticipate specific problem areas related to modified or proposed topography, such as site drainage and construction requirements. By observing the character of natural landforms he should acquire a feeling for harmonizing new grading with an existing landscape.

functional aspects of site topography:

Complex and irregular topographic surfaces tend to stimulate visual interest. They create variety in the scene, partially conceal views to other objects and activities, and establish vantage points that allow the entire playground to be observed at a glance.

Like ideal pieces of play equipment, hills, valleys and small embankments stimulate a variety of emotional responses and permit a range of imaginative interpretations. Moderately steep inclines allow the child to run, coast, slide or roll with the breathtaking feeling of being just slightly out of control. The climb up fosters a feeling of accomplishment and improves the child's strength and co-ordination.

Subtle use of mounds or abrupt elevation changes separate and define zones within the playground, discouraging the overlap of conflicting adjacent activities. While reinforcing the child's sense of personal private space, the difference in elevation can be used to permit unobtrusive observation of the site by adults.

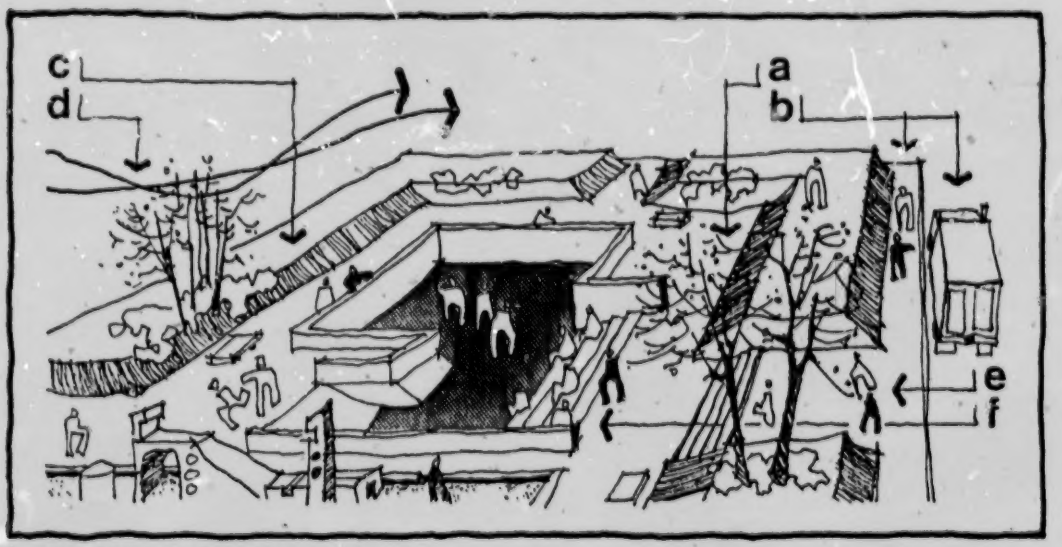
Creative drama and special events can be accommodated on the playground by raising the level around certain spaces to create small amphitheatres. This can be accomplished by using either smooth grass slopes, or hard edges and surfaces to create steps and terraces.

Earthform can be effective in creating a feeling of isolation from the surroundings to clearly identify the site as a special area for children. This can be accomplished by establishing a distinct feeling of entry at the perimeter of the playground using abrupt level chages or converging landforms.

Provided the landform has sufficient scale, it can function in an architectural sense as an enclosing wall. Properly shaped and positioned, it behaves in the same manner as plant material; interrupting sensitive views; channelling or blocking winds; and deflecting noise from nearly streets and industrial activity.

By thoughtfully combining a sequence of bridges, slides, tunnels, and other devices with topography, another dimension is added to the child's special experience.

A. Spacial enclosure
B. Noise and visual barrier
C. Sliding hills and lookout points
D. Wind deflection
E. Entry sensation strengthened by earth berms
F. Level changes for visual interest, seating and observation



functional aspects of site topography

slopes:

Slopes of varying percentages are suitable for a variety of uses; in general, the more acute the incline the more limited its range of possible uses. Hence, contours and slopes accurately portrayed on a base map of the site will greatly assist in organizing the various activities.

Slopes conducive to most play activities range from a minimum of two percent to a maximum of thirty-three percent (3:1); a 3:1 slope is ideal for sliding, while slopes in the two percent range are well suited to active games, passive sitting and craft areas.

Maintenance considerations influence decisions regarding topography once the slope begins to exceed thirty-three percent. This is the maximum incline on which tractor-drawn grass cutting devices can be used. Hand operated power mowers are required on slopes from thirty-three to fifty percent; beyond this, hand scything is necessary.

Slopes of one hundred percent (1:1) are subject to severe erosion and gullying. If possible, they should be protected by planting. Shrubs such as Hall's honeysuckle grow easily and rapidly on steep slopes. Their spreading root system helps support the soil and impedes the flow of run-off water.

Terracing in these areas is another effective alternative. The designer should exercise caution in handling steep, unstable slopes which not only detract from the appearance of the playground but also create a maintenance burden by depositing eroded soil on paths, in sandboxes and catchbasins.

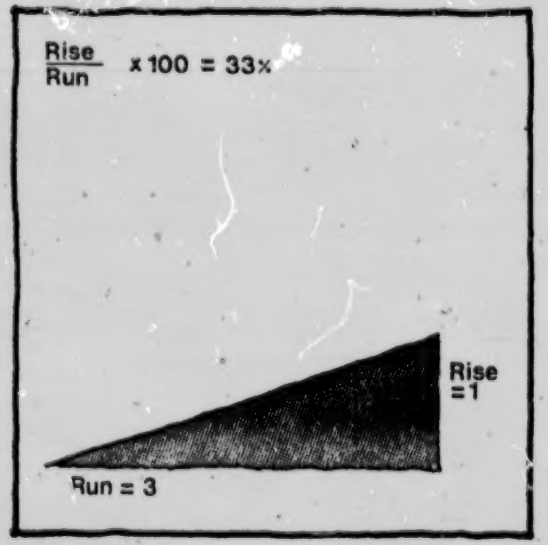
Certain aspects of site work, such as detailed calculations of cut and fill, characteristics and usefulness of various types of construction equipment, and the layout and sizing of mechanical drainage systems are beyond the scope of this handbook. If problems arise in these areas, skilled assistance should be obtained. However, if the designer is interested in technical information on contour diagrams, slopes and grading please see Appendix B 2.

drainage and construction details:

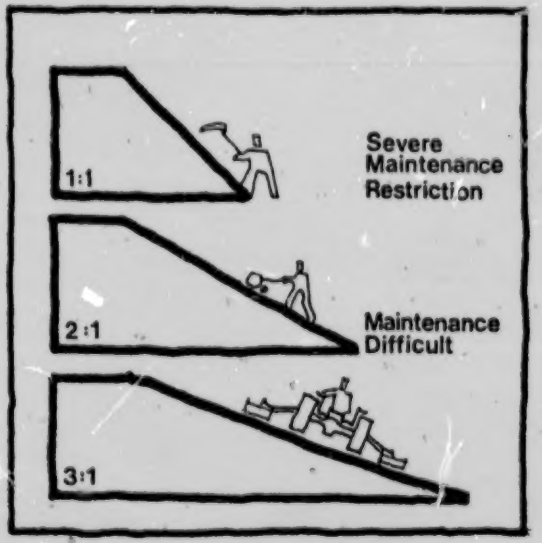
In principle, drainage should utilize natural devices wherever possible, conducting water off the site by relying on, or emphasizing existing water movement patterns. The proposed play facilities' circulation patterns and landforms should all be organized to work in harmony with the existing site drainage in order to minimize costs, labour and site disruption.

A site visit should be conducted prior to finalizing plans for the playground during which all existing drainage problems — depressions, eroded slopes and areas of impervious soil — should be accurately located on plan. Once the preliminary playground concept is overlaid on this drawing, changes may be indicated on the organization scheme. If the concept cannot be adapted perfectly to these conditions, measure may be required to rectify the situation during the process of construction.

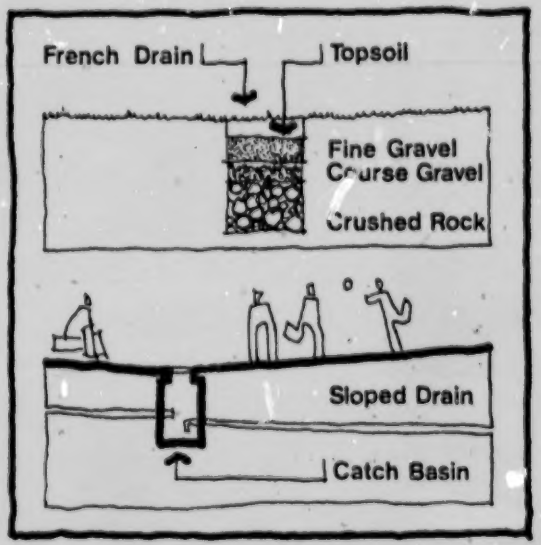
Playgrounds which have not handled drainage well are frequently troubled by standing water at the base of play equipment. This not only inhibits use of the facilities, but also accelerates the deterioration of wood timbers, rusts metal posts, and contributes to frost heaving of concrete and asphalt surfaces. Water that runs across pathways and settles on paved gathering surfaces presents a major hazard in winter. Many times the mistake is made of draining all run-off to a sand play area which is constantly damp and filled with trash.



slopes



slopes



drainage and construction details

The efficacy of the natural drainage system is determined by three major factors: soil, slope, and ground cover. In playgrounds where the terrain is typically flat and where grass and asphalt are the primary ground covers, water is moved smoothly to natural catchment areas if a two percent slope is maintained.

Drainage in difficult areas can often be assisted with the use of swales, (a grass ditch) or gutters which are usually shallow drainage channels surfaced in brick, concrete or asphalt.

There are many circumstances in which the strategy of natural drainage is not effective. This occurs on wide asphalt surfaces surrounded by earth-mounds, in sandplay areas and on large depressed areas of the site underlain by heavy clay soils. To accomplish drainage under these conditions, it may be necessary to resort to various mechanical means, such as tile beas, catch basins or french drains.

Site drainage should respect the rights of adjacent property owners. Any new landfrom or drainage device must not appreciably alter the pattern of drainage over adjacent properties.

new grading and old grades:

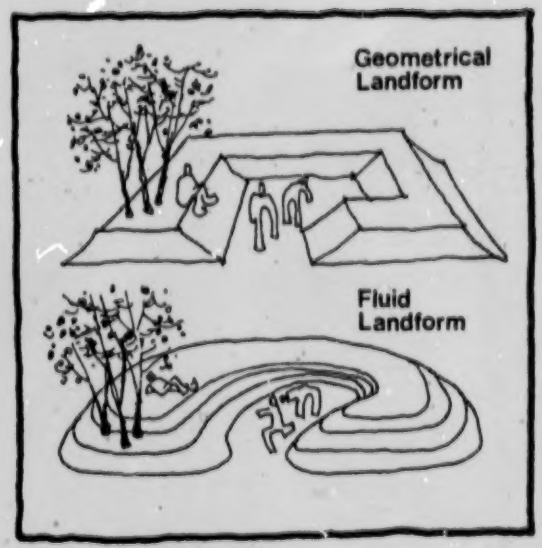
When designing additional site grading it is helpful to establish the concept with the aid of a model. Sand, clay and aquarium gravel are all suitable materials for this purpose. Remember that existing landforms are largely the product of wind and water action and typically have a fluid character. Avoid landforms that have sudden or angular changes of grade and direction. They harmonize poorly with the surrounding landscape and present a maintenance problem.

It is extremely difficult to handle the application of earth mounds to flat terrain. Mounds generally appear more pleasing to the eye if they describe a compound curve along their length or have a form that repeats the dominant geometrical form of the surroundings.

construction considerations:

The construction of additional landform usually requires imported fill. This can often be acquired at no charge simply by appealing to local contractors. The materials used should be clean topsoil or subsoil if possible, however, some rubble such as broken concrete or bricks is not harmful if used in modest proportions. It is wise never to accept lumber, plywood, plaster, lath, old gyprock, or garbage as they cause unstable soil conditions.

When constructing earth mounds apply foundation materials in four inch levels and compact as firmly as possible otherwise soil slippage and erosion occur quickly.



new grading and old grades

CLIMATE

The principles that follow are designed to give the designers of playgrounds an understanding of the basic functioning of our local climate, provide simple approaches to the modification of climatic extremes, and show, by way of illustration, how to capitalize on some of the previously unappreciated influences of our harsher seasons.

The influence of climate, a factor rarely considered by designers, is often critical to the success or failure of the playground. Ontario's climate is severe — subject to extreme variations, consequently, children's outdoor play in this province has a very special character. Typically, our playgrounds function well as children's centres for only a few short months each year, with their activities being sharply curtailed in winter and mid-summer. Only recently has thought been given to a more comprehensive approach to the use of playgrounds in winter and, at present, there are but a few outstanding examples.

sunlight:

Sunlight is a vital ingredient for most outdoor gathering areas and the layout of any playground should be programmed to take full advantage of its effect during many crucial periods of the day. While the sun is usually a friendly companion rendering outdoor gathering spaces bright, cheerful and inviting, it can also be a burden. Many traditional playgrounds have stressed heavily the use of durable, man-made materials such as concrete, asphalt, and steel. In mid-summer, these playgrounds are too hot to be attractive to children; in winter, they are almost certainly too cold to generate any use at all.

sun and shadow patterns:

A summer sun usually appears in a clear sky describing a high arc, while in winter it is always low, providing indirect or diffuse light. Consequently, when laying out playground activity areas for summer use, it is wise to be very conscious of exposure. In winter when skies are grey and shadows are long, the designer must consciously seek out the sun.

In general, activities should not be organized so that they are all in direct sunlight, nor should they be totally shaded. When determining the layout consider such things as the time of day the playground will be used by children of different ages.

Experience shows that playgrounds with facilities designed for very young or pre-school children tend to be in use throughout most of the day. They are infrequently used after 3:30 or 4:00 p.m.

While the young child may enjoy the playground for a long period, the older or school-age child, because of the demands of school and his own restless mobility tends to utilize the playground for shorter intervals. After school and weekends are peak periods for these children. For the older child, however, shade is not necessarily essential and sunny activities space is a prime requirement.

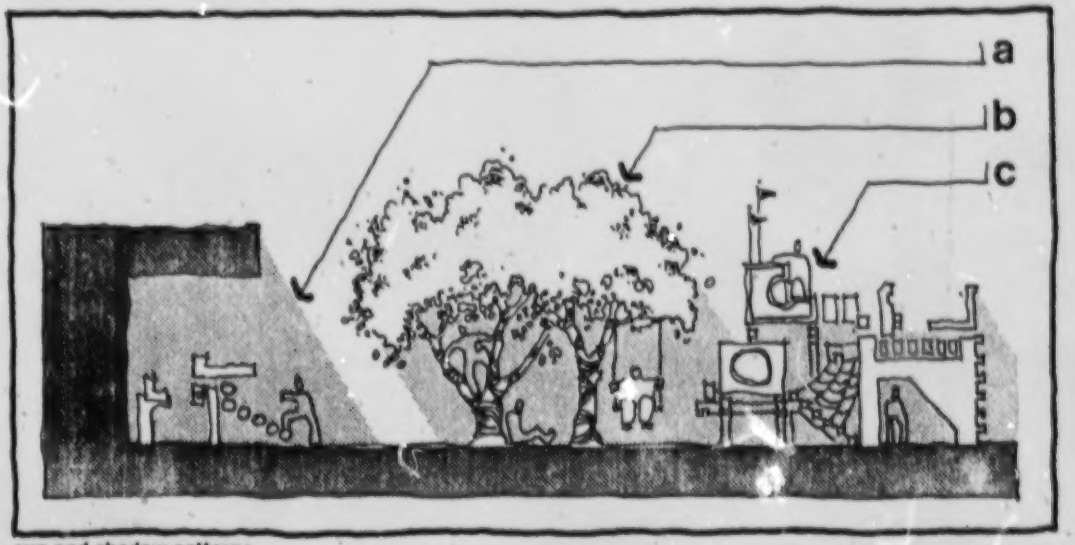
The character of the activity generated will also greatly influence the decision to provide sun or shade. For example, passive activities such as creative crafts and drama benefit from access to shade, while active areas are wisely located in sunny portions of the site.

Access to sun is important for sanitary purposes in sand and water play areas. They should be constructed so as to receive complete exposure to sun

A. Shade provided by mechanical means or by building overhang

B. Filtered shade from deciduous trees

C. Multi-level playground structures create shade below



sun and shadow patterns

at least four hours each day. By early afternoon, however, shade over at least a portion of these areas is desirable. The accompanying illustration demonstrates devices and layouts that will satisfy both needs.

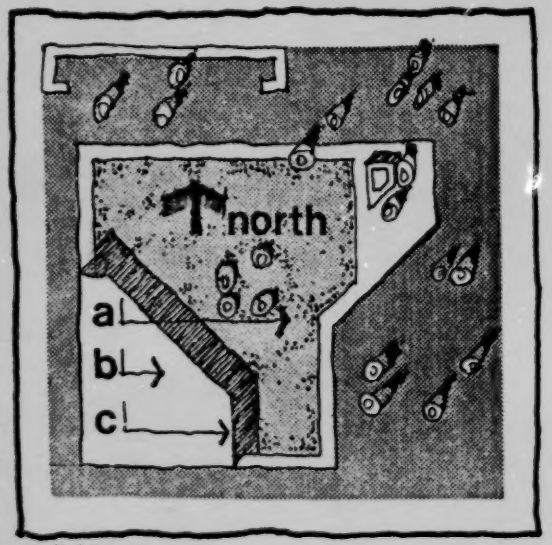
shading devices:

Shade can be generated by various structural devices — canopies, awnings, raised platforms, bridges, catwalks, tunnels, and small huts — all of which can be grouped or placed on site in an intriguing fashion. The playground can easily incorporate many of these devices if the concept is expanded to include many levels and spaces.

A. Sunny sand play area for cool periods

B. Canopy to shape potion of sand area for hot period

C. Shadow covers only a portion of entire area and roof is positioned to permit areas below it to receive 'some' direct sunlight each day. Note canopy is on southwest side



sunlight

Perhaps the ultimate shade source is the common deciduous tree, a device rarely used in playground design. Apart from its obvious aesthetic appeal, a large shade tree provides a cool and inviting micro-climate — the light is gently filtered and the ground space is kept clear for use. Because they shed their leaves in the winter months when the penetration of sunlight is desirable, they are well adapted to playgrounds intended for use in winter. Playground designs that consider the future incorporate both structural devices and deciduous trees in order to provide shade.

wind:

Consideration should be given to the effect of winds on the design and functioning of the playground. Human beings tend to react differently to wind under different circumstances. High temperatures, for example, are made more tolerable when they are accompanied by gentle air movement, but winds quickly become annoying as the velocity increases. Also, because loose materials such as wood chips and sand are often extensively used as ground covers, it is important to protect certain areas of the playground from excessive wind.

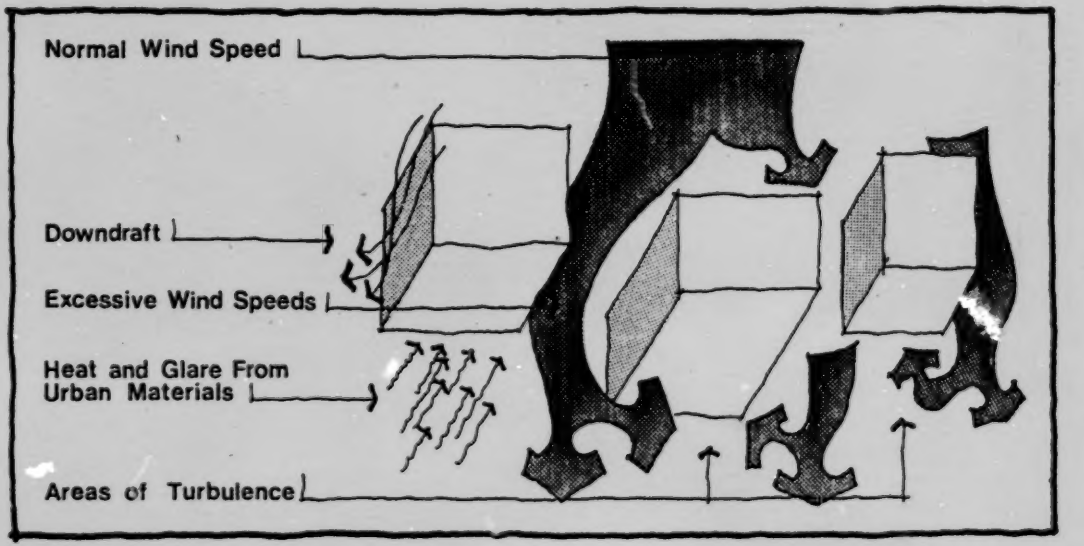
In principle, the designer, when considering summer climate, should make provision for local wind protection in specific parts of the playground such as sand play areas, yet allow for the free circulation of cooling summer breezes through the remainder of the site.

A playground designed for use in winter, when any air movement tends to lower the effective temperature, should, if possible, provide protection from prevailing winter winds.

Winter winds are generally thought to approach from the north and north-west; summer winds from the south-west. This should be verified by the experience of local residents before planning the layout.

While these approaches may be valuable in rural and suburban situations where most playgrounds are built, they are unsuitable where most playgrounds are built, they are unsuitable for many dense urban areas. Here, the wind patterns are complex and erratic, subject to the influence of large buildings and wide expanses of asphalt.

Because turbulence increases as the buildings get taller and longer, and because the effect is



wind

27

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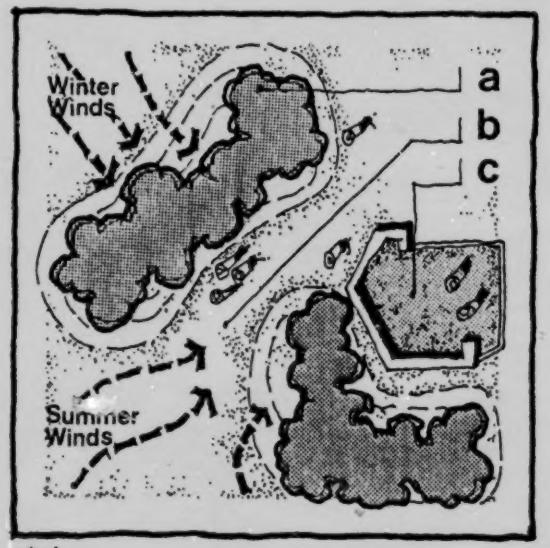
exaggerated when large buildings are grouped together, it is impossible to predict accurately the behaviour of winds in these situations. Frequent observation of the site will determine the extent of wind protection required. It may be necessary to develop the playground so that portions of the site are useable regardless of wind direction. An absence of wind to cool the playground in summer may also become an acute problem in urban areas requiring the design to include such things as fountains and wading pool to help children cope with extreme temperatures.

A. Windbreak positioned to block cold winter winds

B. Cooling summer breezes are funnelled into play area

C. Localized protection in form of wall protects sand play area



wind

wind breaks:

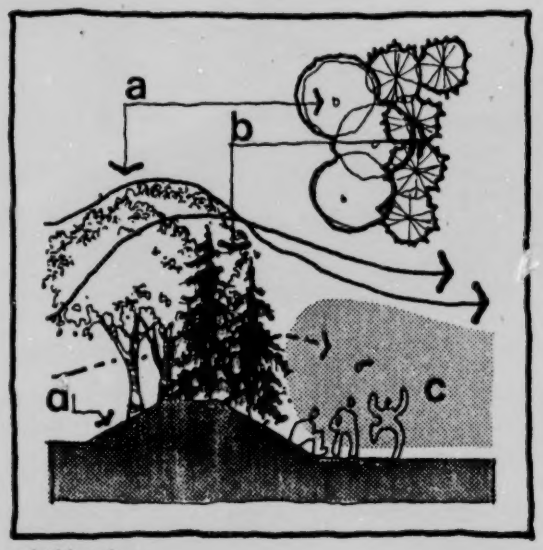
The forces of wind can be moderated by construction of windbreaks — either upright structural elements such as palisade walls or more natural combinations of landform and trees. These devices, which may have other functional and aesthetic purposes, may also be planned to block or channel winds. The prime determinant in measuring the effectiveness of windbreaks is height. A fifty percent reduction in wind speeds can be expected for an area downwind of ten times the height. The accompanying illustration diagrams this principle and provides a sample layout for an effective windbreak.

A. Fast growing inexpensive tree such as willow or poplar

B. Inside row of dense evergreen material

C. Protected area 10 times the height of the windbreak

D. Windbreak emphasized by combining use of trees with earth mounds



wind breaks

Windbreaks formed by trees are particularly effective because they allow a certain amount of air to pass through, hence, reducing turbulence. Wind speeds are further reduced by combining trees with landform and/or increasing the thickness of the barrier.

materials:

The materials chosen for use in the playground will determine the level of physical comfort provided in extreme weather conditions and hence greatly influence the popularity and success of the site. Materials should be chosen with care — particularly in urban areas where the natural climate has been modified. Mid-summer temperatures in the city, because of a dearth of trees and an absence of ground water, often exceed those in the nearby countryside by as much as ten degrees.

The heat-absorbing characteristics of materials should be the criteria by which they are judged. Man-made materials such as cast iron, concrete, asphalt and sheet metal become excessively hot on summer days; therefore, efforts to minimize their use and place them within the pattern of shade during hot hours are appropriate.

Materials such as wood timbers and old railway ties, on the other hand, have a rough, porous surface that is cooler to the touch; hence, they are the most suitable materials for constructing play equipment.

Trees, grass, shrubs, and wood chips contribute to a pleasnat environment by moderating high temperatures. They should be extensively used in any urban playgrounds.

winter use:

The use of playgrounds in winter has just begun to be explored. With sympathetic design and energetic leadership, playgrounds can become activity centres for children in winter as well as spring, summer and fall.

For example, ice surfaces of many kinds can be used effectively on the playground. An insulated supply of water and a careful layout are all that is

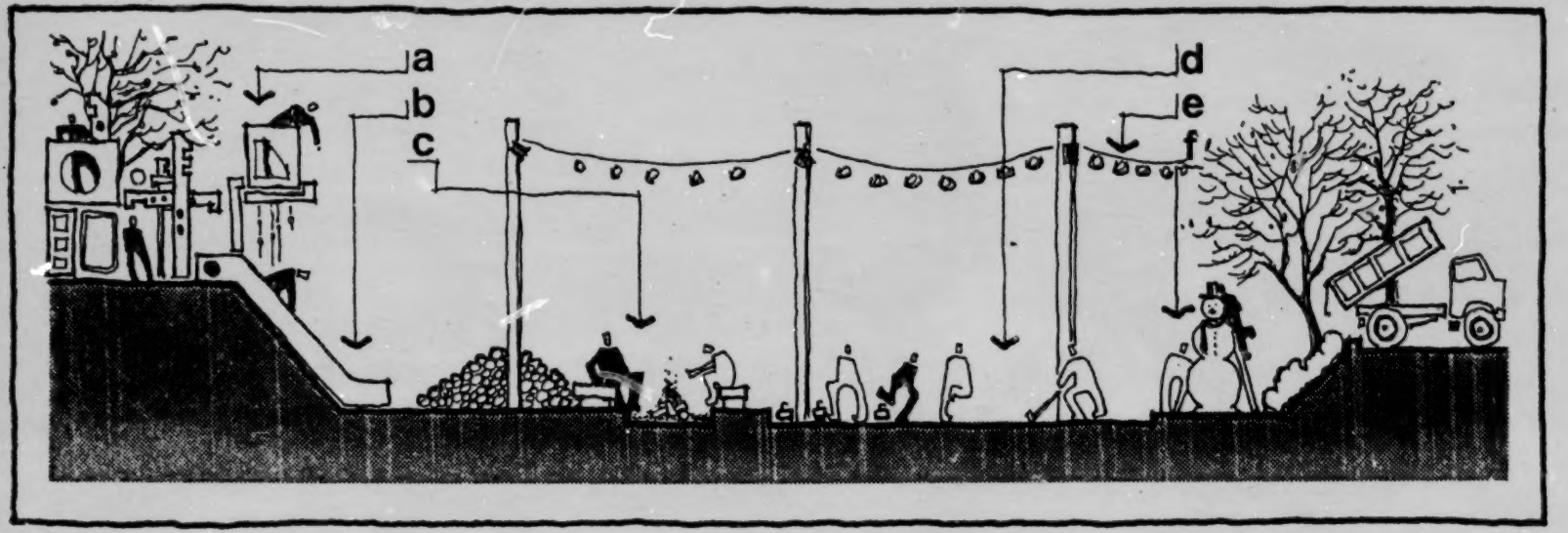
required for the interior of the playground to support skating, snow sculpture, tin can curling and ice slides.

A fire pit included on the site with a generous supply of wood will provide an interesting activity for the children while lengthening the period during which they can remain on the playground.

Snow from nearby streets and parking lots can be imported to the playground as an additional raw material.

The most important consideration for a winter playground is the material used for its construction. Nothing is warm in winter, but wood structures are tolerable and safe under the most extreme weather conditions.

A. Wood used to make play equipment useable in winter
B. Ice slides
C. Fire pit and wood supply
D. Skating and curling on ice surface
E. Colourful lighting extends period of winter use
F. Stockpiles of snow as playground materials supplied during clearing operations on local streets and parking areas



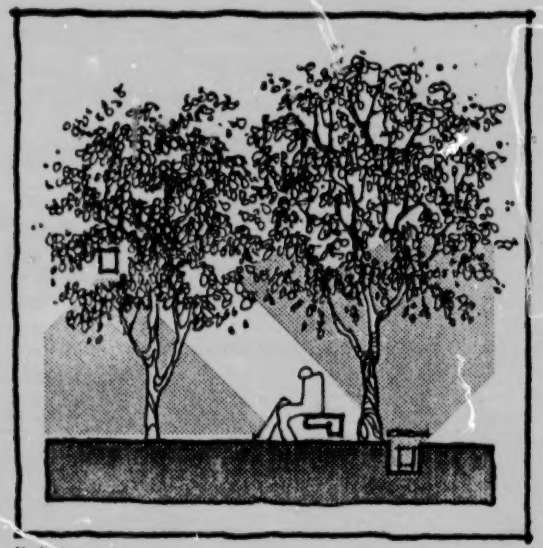
winter use

LIGHTING

Lighting, if used at all on a playground, is typically used to prevent acts of vandalism; the functional and aesthetic possibilities of lighting are rarely considered.

By combining a pleasant landscape, comfortable site furniture, and subtle lighting, the playground can become an inviting place in the evenings for the activities of both children and adults. It can become a place to sit, play, meet with friends, conduct community gatherings, hold dramatic events — there are a great many possibilities.

In winter when darkness arrives early, lighting is particularly valuable, because the playground becomes useable during the gloomy hours after school is out. It is especially important if the playground has an ice surface intended for skating.



lighting

In the past typical playground lighting has been high efficiency type with intense sources mounted well up on buildings or large poles. These light fixtures produce a cold, unfriendly colour cast suitable for parking lots and highways, but completely inappropriate to spaces intended to encourage gatherings of people. In general a normal low wattage, incandescent light source provides the warmest, friendliest type of light.

There are a variety of efficient and practical site lighting techniques that can be used. The light source does not necessarily have to be elevated with the fixture directed straight down.

Inverted sources of illumination on the underside of leaves, branches, and nearby objects, create interesting patterns and an appealing indirect light conducive to outdoor gatherings. The light source can also be scaled to match the activity by using low level mountings that direct light in a wash across grass, paving and other surfaces.

Light fixtures provide a good opportunity for the incorporation of electrical outlet plugs. An available power source allows the hook-ups of amplifying equipment for community activities, permits special occasion lighting with coloured bulbs or lanterns and allows the children to bring record players and other similar devices to the playground. The outlet should be weatherproof and lockable for safety.

To reduce maintenance costs and insure safety the light fixtures should be made of unbreakable acrylic materials and all ground mounted lights should be covered with a sturdy grill.

SAFETY

Modern creative playgrounds have maintained a commendable safety record. A well designed playground has a number of different areas and activities designed for all ages of children. The challenges are graduated and the child is given the opportunity to move from one element to another at pace determined by his muscular development and co-ordination.

He is not faced, as in the traditional playground, to mold his activities to an inflexible pattern or cope with a static superstructure of ironwork designed to accommodate the mythical average child. The environment in a creative playground is typically one of wood structures underlain by soft surfaces as opposed to the iron, concrete and asphalt of the traditional playground.

All potential danger sources should if possible be eliminated at the planning or construction stage. To this end the material in the following section outlines the more common safety hazards and their remedies.

Wherever possible all areas of the proposed playground should be examined to eliminate sharp edges. This usually entails bevelling wood edges in key areas with a wood plane or sanding lock. The ends of all metal pipes should ideally be imbedded in wood; however, if this is not feasible they should be capped with a permanent rubber end piece.

In general nails should be long enough to grip firmly, but not so long as to protrude on back surfaces. If long nails must be used, thoroughly crimp the points into the wood. Use galvanized nails to prevent rust and always countersink the nail heads so that they do not catch on skin or clothing.

Bolts should also be kept as short as possible and be recessed on outer or contact surfaces. Be especially cautious of long bolts at head heights or in dark areas. If possible trim all bolts flush with the nut using a hack saw and file smooth.

All bolts should be examined periodically and tightened if necessary. Occasional checks for nails that have worked out of the wood will eliminate many small injuries.

Moving parts should be designed to prevent children from thrusting fingers into the works. If possible wearing parts should have grease fittings, this reduces wear and provides the extra benefit of making the equipment usable in winter as rust is virtually eliminated.

All materials used in construction should be critically examined for various hazards: splinters on wood, burrs on metal pipe, sharp edges on sheet metal, etc. Whenever possible use only sound construction grade cedar and match size and strength of material to the size, strength, and character of the users. Periodic maintenance checks should be made to reveal weak or fractured boards and faulty hardware. Repair and replacement should be made as soon as possible.

Dynamic play equipment should be thoroughly considered for the full range of possible movement and conflict. For example the bottom of slides should be kept well away from curbs and other objects, and swings should have adequate space to move sideways as well as forward and backward. (See discussion in circulation section).

Climbing equipment and areas where children may construct raised structures should be zoned away from overhead wires, while digging should be prevented if buried utilities are present.

Exercise caution in the use of wood treatments such as creosole, avoid planting shrubs with thorns, be cautious with pesticides and fertilizers and avoid the use of toxic paints.

Finally, in the case of emergency post pertinent phone numbers and sources of help in a prominent location.

VANDALISM

Vandalism looms large as a concern for the builders and administrators of playgrounds, unfortunately there is no sure remedy available for the designer. High walls and elaborate fences provide a measure of security, however, they are predictably never high enough. Frequently the more extensive the preventative measure employed the greater the challenge it offers a potential vandal.

At the design stage a realistic appraisal of the habits and propensities of the neighbourhood youth is perhaps the first and essential step. An urban neighbourhood with severe social problems and a high incidence of crime may inspire a different approach to site planning and organization, one that emphasized stronger materials and provides for stricter control of tools, manipulatable equipment and loose objects. It may be necessary to sacrifice internal privacy somewhat in order to permit casual policing of the site by neighbours and passers-by. Night lighting may become a high priority item.

Attempt to read through acts of vandalism to their source for surely no playground will be entirely free of them. Vandalism is in many instances a type of play. Defacing walls and surfaces with names, initials and sayings is a typical example of what adults consider vandalism. To the child on the other hand it can be a very constructive and expressive act. Playgrounds should be designed to absorb this kind of activity by constructing equipment out of wood, by providing graffiti walls and by organizing events on the playground that allow the children to design, build and point their own contributions to the playground.

If children are permitted to participate in the actual construction and design of the playground their feelings for it will be strengthened. As a by-product we may find the children act to secure the playground themselves. If it becomes in a sense their property they will censure or exclude children whose behaviour is particularly destructive.

A pattern of vandalism may develop in response to poor maintenance. Worn or inoperative equipment may be destroyed simply because nothing else can be done with it.

Vandalism is a complex social problem and most of its root causes are beyond our control or influence, however, one plausible source of this kind of behaviour is the widespread lack of space or facilities for children. Perhaps by providing child-oriented challenging playgrounds we are offering a partial solution to the problem.

CHAPTER TWO
Playscape Ideas
and Materials

group swing

bouncing net

musical drum

climbing complex

belt swing

amphitheatre

sewerage pipe

sand box

a simple walkway

fire pit

CHAPTER 2

There are basically two approaches to playscape design for a creative playground. One way is to install premanufactured play equipment. This equipment is available in conventional or comtemporary types. The conventional type is usually made of metals and imitates forms of animals, cars, rockets, and gymnastic facilities. The contemporary type is commonly made of construction materials such as timber, concrete, plastic, etc. and available in several pieces so that one can arrange them in various ways.

The second approach is to design and construct a playscape utilizing new and/or recycled materials. This approach starts with a conscious effort of studying how children play and what kind of things would normally attract them. Consequently, the study generates ideas, and these ideas develop means to construct playscapes. Needless to say contemporary and conventional playscapes can also be adapted into the scene by connection, modification and repainting. If one is designing this type of playscape, he should pay great attention to the overall composition of the structure and selection of colour, because psychologically these elements are attractive to children as well as adults. Ideally the composition and colour should be sculptural, bright, exciting, yet not overmassive and vibrating.

In the following pages, we will discuss primarily the second approach, and concentrate our effort on some simple ideas as well as the use of materials. It is necessary to note that each idea will be presented individually. We believe that an exciting composition of the playscapes relies totally upon the participating community group.

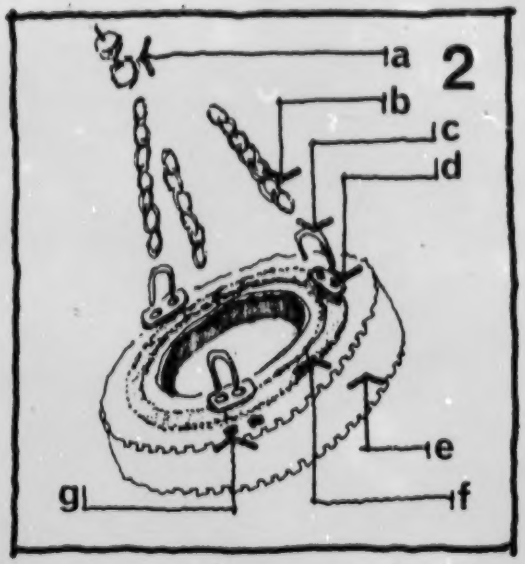
GROUP SWING

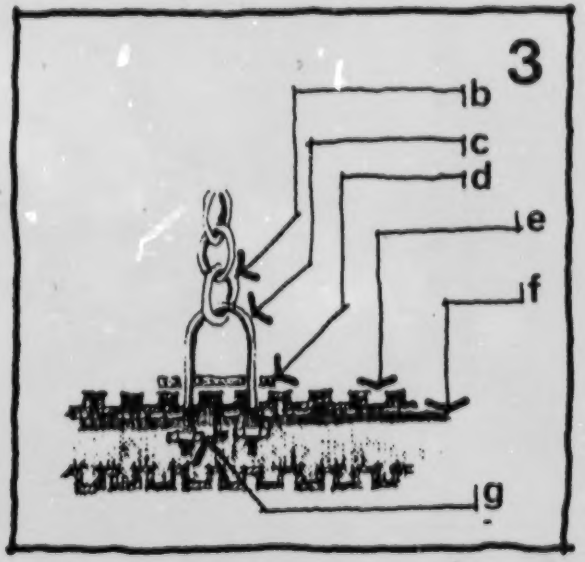
Building a conventional swing is expensive in terms of construction and its space requirements, and can serve only a limited number of children at a time. Therefore, the idea of Group Swing is more practical. It requires less effort in installation and can serve several persons at the same time.

Drawing 1. One way to make a Group Swing is to attach an old tire with three chains.
Firstly, set the tire horizontally and make three balance points.
Secondly, connect one end of each chain to a balance point by a "U" shape bolt.
Thirdly, connect the other ends of the three chains with a metal ring which is attached to a ball joint. (swivel joint)
Fourthly, secure the ball joint to any supporting frame or joist by bolting.

Drawing 2. This is a sequence of installation and it shows the materials needed.
a — Ball Joint (swivel joint).
b — Metal Chain.
c — "U" shaped Bolt.
d — Metal Plate with two holes, an attachment of the "U" shaped bolt.
e — Used Tire
f — Inner Metal Ring, 2 inches wide, 1/4 inch thick. It supports the upper phase of the tire and attaches to the "U" shaped bolt.
g — Nuts for the Bolt.

Drawing 3. This is a section which provides an enlarged view of a critical joint. The detail of this joint is identified in Drawing 2.





BOUNCING NET

One of the many surplus products in our present auto-industry is the used tire. Up to the present, they have not been successfully utilized or recycled. Fortunately for us they are extremely valuable as a construction material for playgrounds. They are reasonably durable and flexible. Needless to say, they have an obvious bouncing and stretching characteristic. Due to these physical properties, the idea of a bouncing net is created.

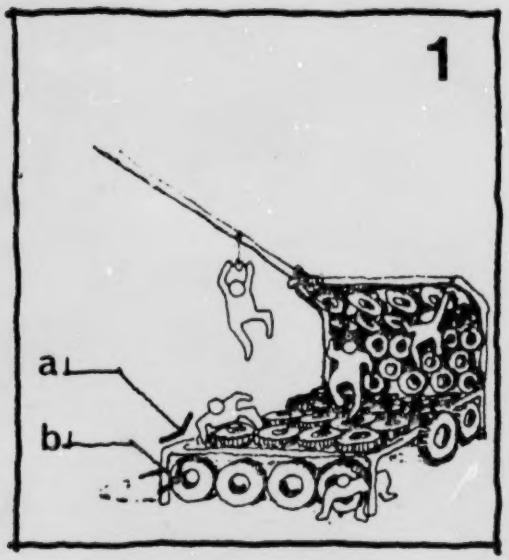
Drawing 1: Bouncing Net is a simple playscape that provides a surface which children can use for jumping, crawling as well as bouncing. It is made of one or more nets of used tires. These nets are secured on some kind of framework, as shown in Diagram a. *b* is the individual tire which attaches to the framework and other tires. This necessitates two types of joints as shown in Drawing 3.

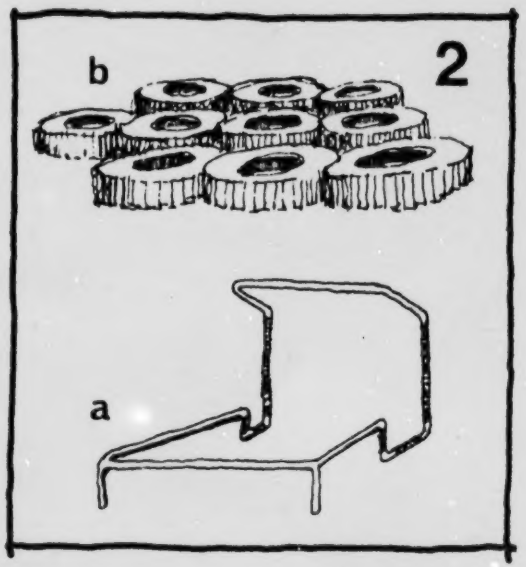
Drawing 2: 2*a* is a framework made of steel pipe. It consists of a horizontal bed-frame as well as a vertical wall-frame. It is designed to be heavy yet can be portable with four or five adults' effort.

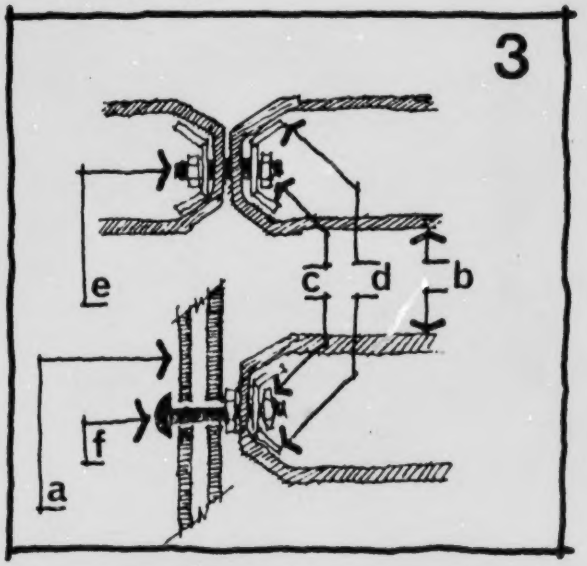
2*b* illustrates one way the tires can be arranged.

Drawing 3: There are two types of joint detail required for this playscape. One is used to join tires together and the other is used to join tires to metal pipes. The upper drawing shows the former type and the lower drawing shows the latter type of joint.

a — is a metal pipe.
b — is a cross section of any used tire.
c — is a washer.
d — is a metal plate to support the edge of the tire.
e — is a metal two-end screw, used to join tires together.
f — is a long one-end screw, used to secure tires to pipe.







MUSICAL DRUM

The basic idea behind the musical drum is that anything which generates sound always amazes children. If it can allow children to create different pitches, it becomes even more exciting.

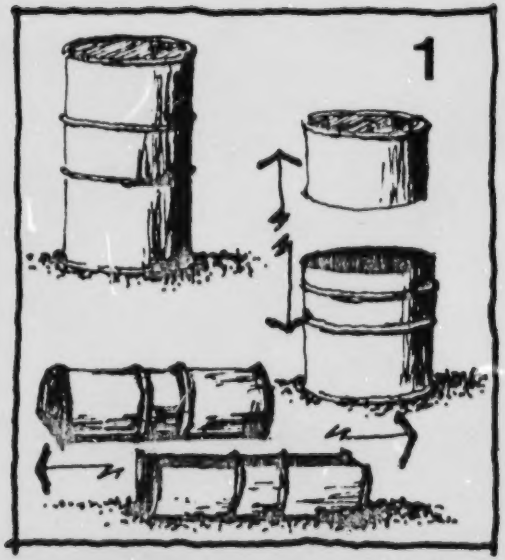
Drawing 1: This playscape is made of used gasoline drums; again a surplus of our industry. Firstly, one should make sure the drum is clean inside and outside. Secondly, cut the drum with a metal powersaw in two ways, as shown in the diagram. Thirdly, smooth the edge with the sanding or folding method to eliminate its sharp edges.

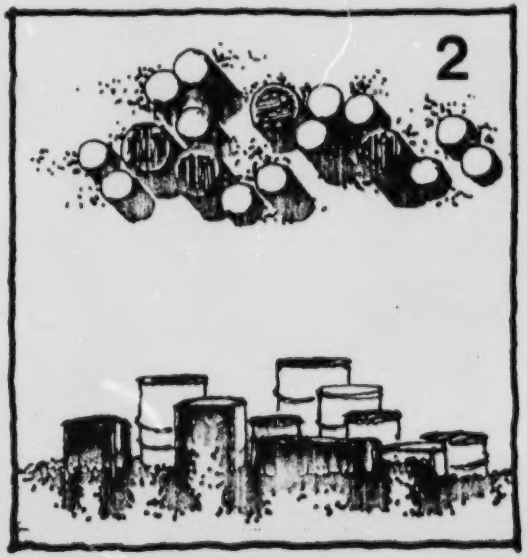
Drawing 2: Different size of drums should be used and arranged with various spacing, so that short distance climbing, jumping and hiding activities can take place among them. Visually, they can be very interesting if they are arranged in any irregular or informal patterns. The key to making these drums musical depends upon the infill of sand inside these containers. During construction, one can drill a small hole on the top of the drums and pour sand into them and seal the holes by welding. A different amount of sand in these drums of different sizes and heights causes the sound waves to vibrate differently. Therefore various pitches can be created when children are hitting or jumping on them.

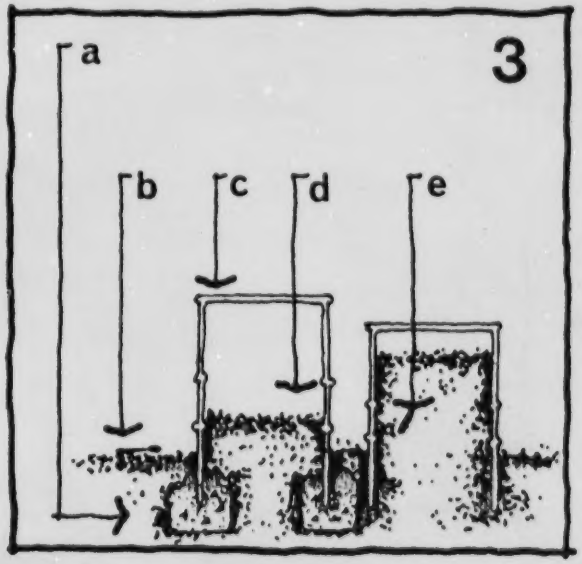
Drawing 3: The diagram shows two kinds of footings.

1. If the drum contains very little sand inside, it requires concrete footing to secure itself in the sand base.
2. If the drum is filled with a lot of sand inside, it requires no footing due to its heavy weight.

a — Concrete Foundation
b — Sand on Grade
c — Oil Drum (used & repainted).
d — Sound Chamber inside the drum.
e — Infill of Sand (consider different amounts of infill).







CLIMBING COMPLEX

Children are always attracted to different ways of climbing. The more complicated settings seem to be the more challenging to them. "Climbing Complex" provides this opportunity with even more fun because it is not only a climbing structure but also a playscape which can include facilities for swings and sliding, etc.

Drawing 1: It is effective to make this playscape seem complicated and challenging, therefore using a large range of materials is very important. Due to the colour, texture and form of the various materials, one is allowed a great deal of flexibility in the design and manipulation. The materials which can be used are lumber, raw timbers, water pipes, dead tree logs, heavy wooden crates, and used tires or gasoline containers. These are available in the market or any junkyard and one can obtain them at a very low cost or for free.

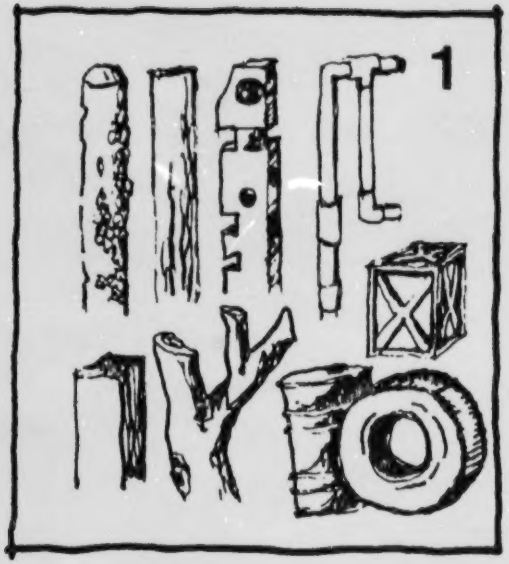
Drawing 2: When one is designing the "Complex" one should carefully consider the height, size and spacing between each climbing element. Height and size should always be in proportion to the primary age group of children for whom one is designing. Unquestionably, extremely pointed corners, sharp edges and high elements should be avoided or eliminated.

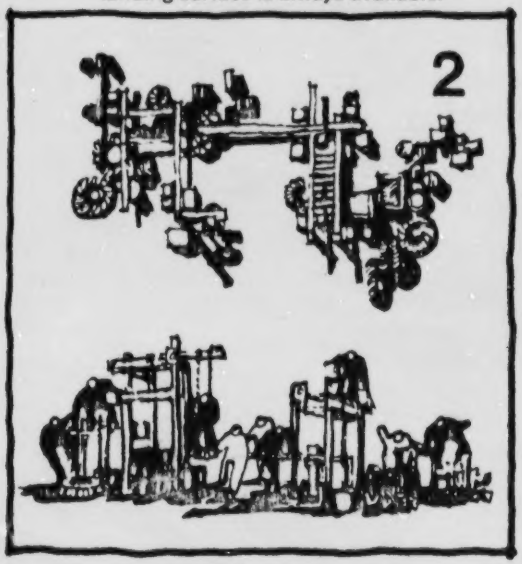
In constructing the "Complex" there are several fundamental principles involved. They are as follows:

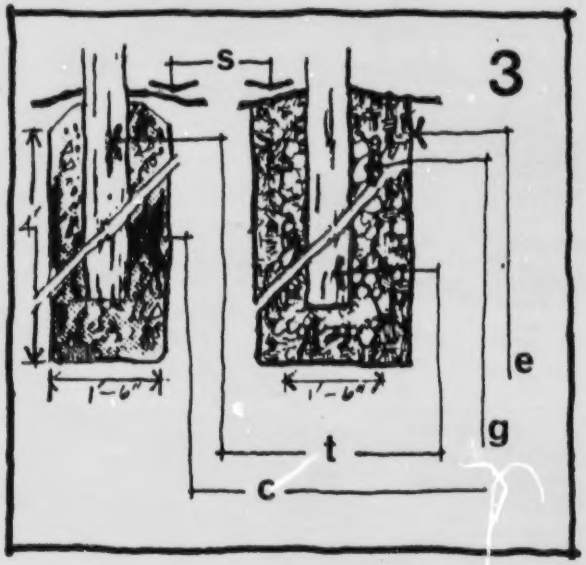
1. A connecting element from one end to the other can generate continuous play. It is even more effective if the "Climbing Complex" is connected to other playscapes.
2. A high and sturdy framework is necessary if one intends to hang swings of any type on the ends or sides of the complex.
3. It is very important to have sand or bark chips as base materials underneath and surrounding the "Complex", so a soft landing surface is always available.

Drawing 3: Footing is definitely required for this playscape. The average footing in Southern Ontario climate is a minimum of 4 feet into the ground. It can be constructed by pouring concrete or just compacting sand-gravel around the bottom of the posts.

s — sand on grade surface should gently slope away from post.
t — lower end of post.
c — concrete footing.
g — coarse 3/4 gravel, compacted around post.
e — earth around the footing.







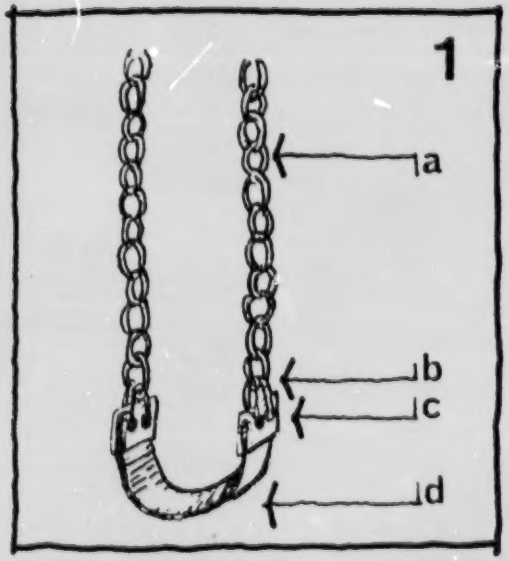
BELT SWING

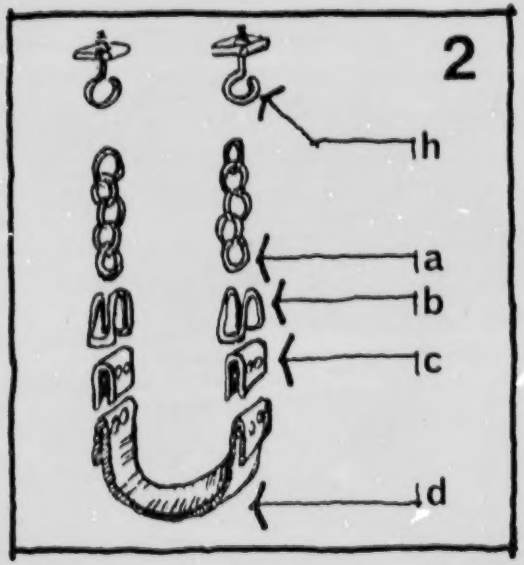
The conventional swings are usually made of wooden board and metal chains. From several studies and investigations, they are considered as potentially dangerous due to their weight and hardness. The Belt Swing is designed to deal with this problem.

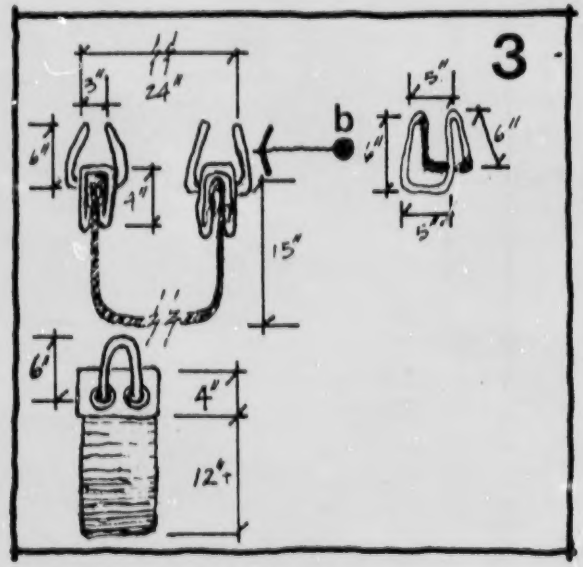
Drawing 1: There are four materials which are essential in the make-up of a Belt Swing.
a) metal chain or cable, b) metal hook-joint, c) metal clipping and d) leather or heavy canvas belt.

Drawing 2: This is a dissecting diagram indicating the sequence of installation.
a — metal chain.
b — hook-joint.
c — metal clip.
d — leather belt or canvas belt.

Drawing 3: All dimensions are appropriate for adaptation.





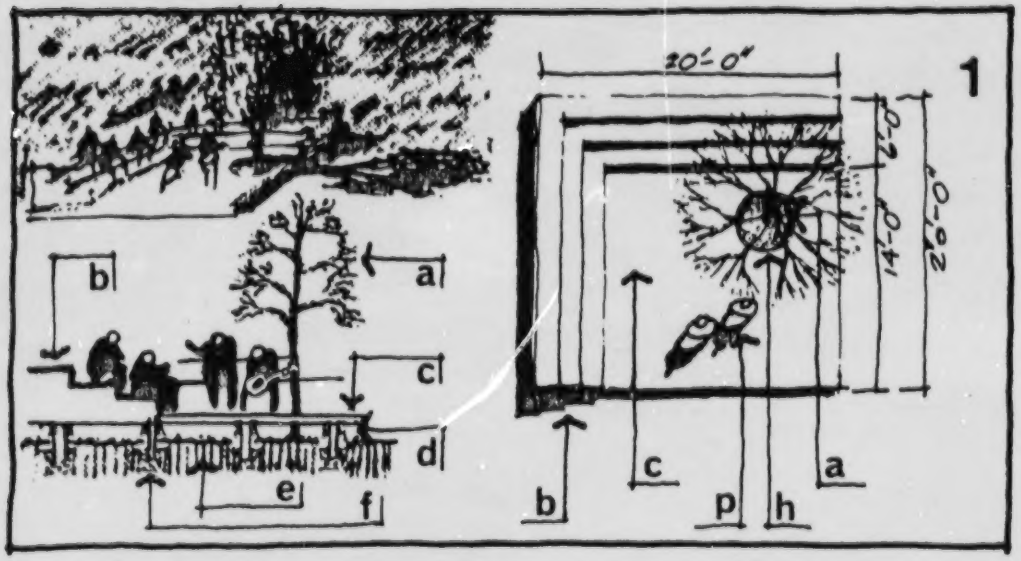


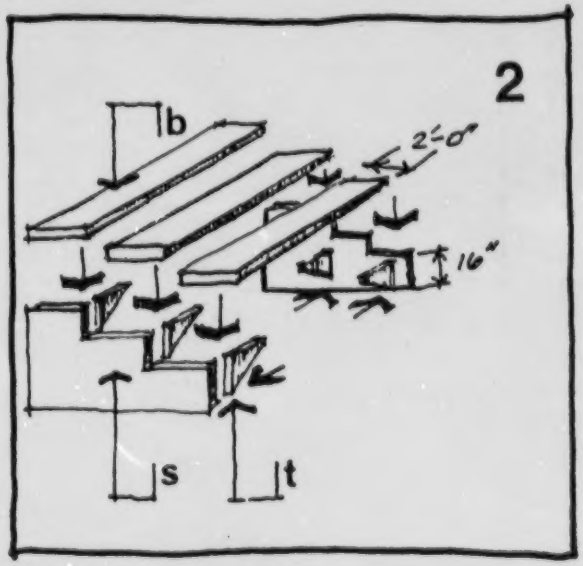
AMPHITHEATRE

An amphitheatre is an amenity in a playground. It is not a necessity; however, it enhances the many uses of a play area. Sometimes it can be used for outdoor performances of music or drama: othertimes, it is merely a quiet place for a sitting or group gathering.

Drawing 1: This is a simple and small amphitheatre. Basically, it is a wooden deck with steps as sitting facilities. There is a focus area for the performance or gathering. The tree is part of the visual focus and the source of shade.
a — the tree.
b — step-bench.
c — deck.
d — posts and joists which support the deck.
e — earth.
f — concrete footing for the deck
h — tree-hole in the deck.
p — people.

Drawing 2: This is an analytical diagram. It shows the different parts which are required to build the step-bench.
b — is the bench-board on which people can sit
s — is the siding which supports the three levels of bench-boards
t — is the triangular piece which holds the bench-boards and the sidings together.





SEWERAGE PIPE (storm sewerage)

Sewerage pipe is another construction material which can be modified for playscapes. It is precasted from concrete mixture and usually available in a cylinder form of various sizes. Its physical property is extremely durable and resistant to weathering and intensive use.

Drawing 1: Normally sewerage pipes can be cut by a "special saw". The diagram on the left shows the result of a horizontal cut and the diagram on the right shows the result of a vertical cut.

Drawing 2: a) One idea of using the sewerage pipe is for planters. The pipe should be filled with coarse gravel and earth in the lower portion, and good top soil in the upper portion. Three feet is the recommended height of the planter. The size of the pipe can range from 24 inches to 72 inches.
The recommended plants are low shrub, ground covers and ivys.

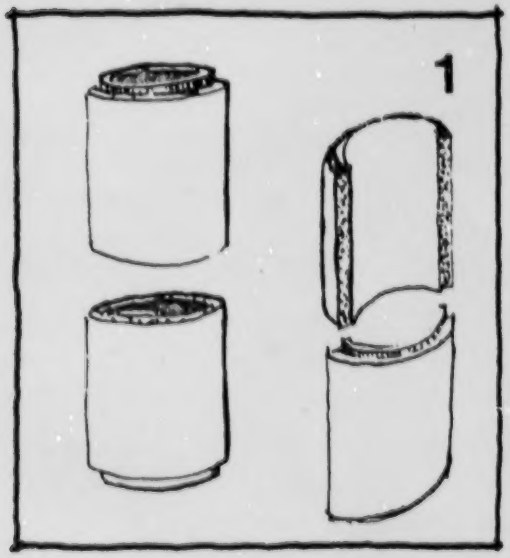
b) The pipe can also be modified to retain water and become a water play facility. The height of the exposed pipe can be any dimension. However, the depth of the retained water must be shallow — 4 to 6 inches.

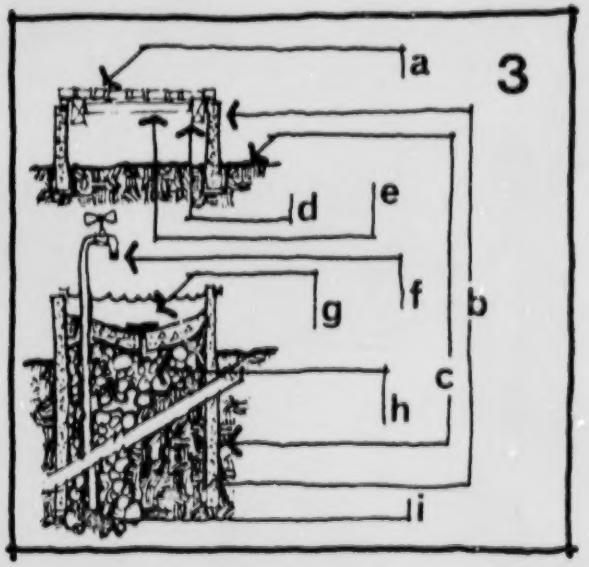
c) A pipe can also be a good sitting element, if it is put in a place 16 to 18 inches above the ground and covered.

d) A pipe can be used as a low slide due to its rounded and relatively smooth surface. To make the low slide one should cut the sewerage pipe horizontally and install it in the same manner with rounded side facing up.

e) During the installation of the low slide, one may cut big holes into the pipe and turn it into a crawling apparatus as well.

Drawing 3: The upper diagram shows the cross section of a round bench.
a — is the wooden cover which is provided for people to sit on.
b — is the sewerage pipe.
c — is the surface of the ground.
d — is a small piece of 2 by 4 inch lumber which is nailed to the bottom of the bench cover. It serves as a support.
e — is also a piece of 2 x 4 and serves as the joist for the bench.
The lower diagram shows how a pipe can be modified into a water play basin.
f — is a water tap built into the basin.
g — is a plug in the concrete bottom of the basin.
h — is the infilled gravel in the pipe for draining purposes.
i — is the water pipe which supplies the water to the tap.





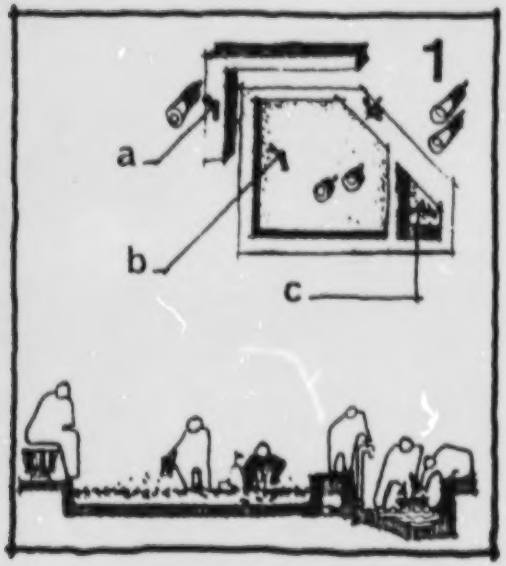
SAND BOX

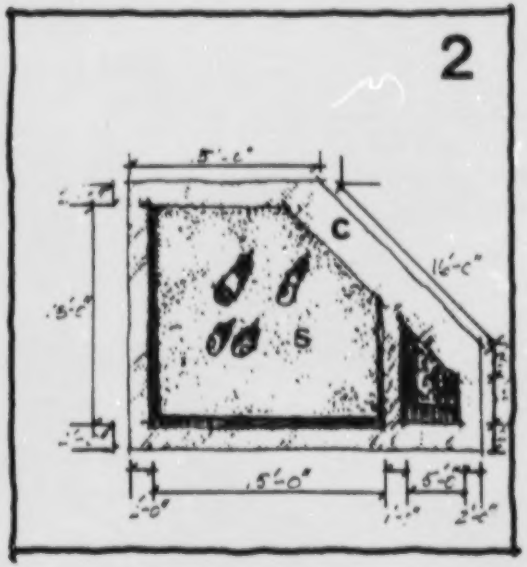
A sand box is an asset to a playground. It is especially attractive to the younger children. Most preschool children enjoy the sand box because sand is soft, managable and provides for many play experiences i.e. building, digging tunnels etc.

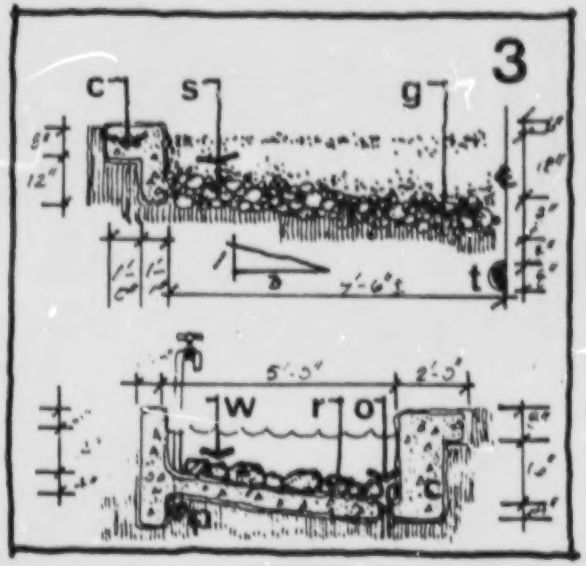
Drawing 1: *a* — shows a bench. Providing a sitting element next to a sand box is considerate as it invites parents to stay and be with the children as they play.
b — is the sand box. Its size should be designed in scale with the younger childrens size.
c — is an area for water play, the combination of water and sand is the most exciting play media in any playground. By adding a little water outlet next to the sand area, one can make a sand box more dynamic.
The section drawing illustrates different uses of the bench, the sand box and the water outlet.

Drawing 2: All dimensions in this diagram are recommended.
c — is the edge which retains the sand.
s — is the sand.

Drawing 3: The upper section indicates various materials and dimensions required to construct a sand box.
c — concrete edge.
s — fine sand, minimum 12 inches deep.
g — gravel (as illustrated) for base, minimum 8 inches deep.
t — tile drain, buried beneath the gravel base in the centre of the sand box.
The lower section is the water play area. It consists of a basin and an outlet.
w — water.
c — concrete base and edge.
r — cemented, round rocks.
o — outlet at the bottom of the basin.
p — water pipe.
All dimensions are recommended.







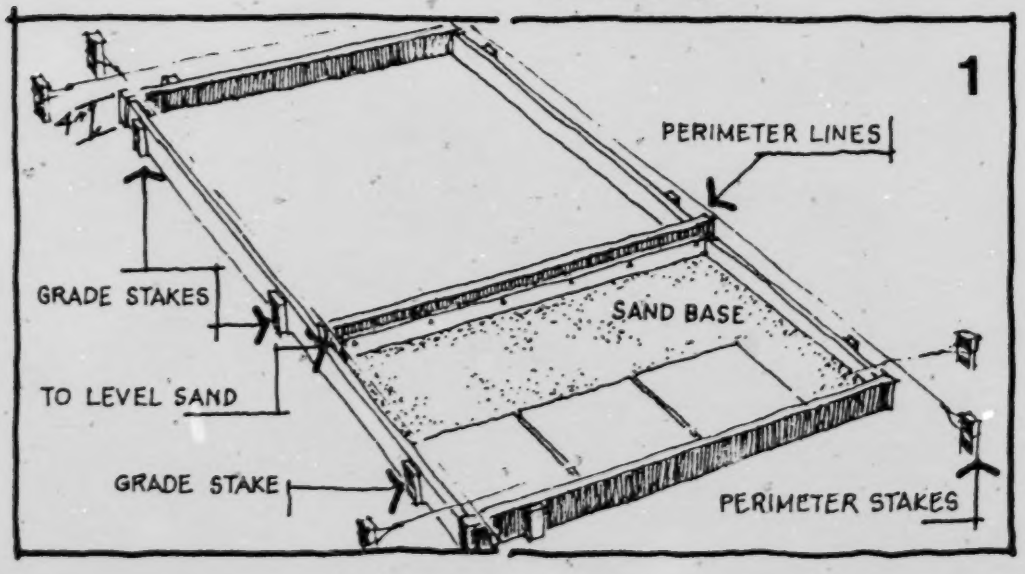
A SIMPLE WALKWAY

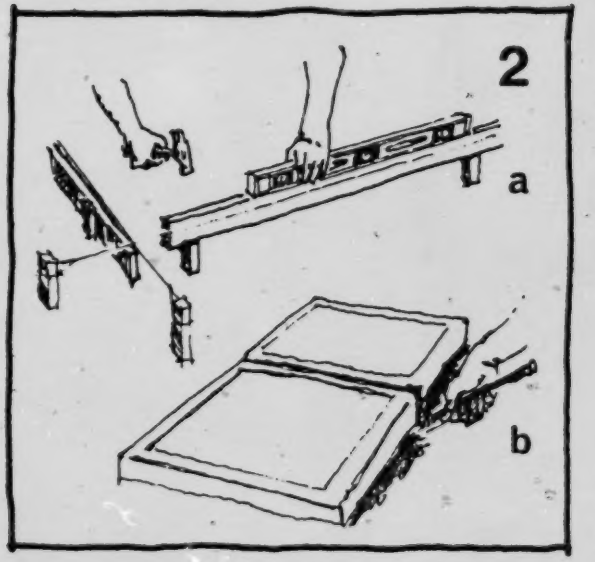
Building a walkway with concrete slab (patio block) is the most inexpensive and simple method. There are five steps involved.

Study Drawing 1.

1. Note the perimeter stakes which are set beyond the area to be excavated. The lines connecting these stakes establish the four sides of the patio. Drive grade stakes 1 inch outside the lines connecting the perimeter stakes. In Drawing 1, 3 grade stakes are shown on each side. A carpenter's level, set on a board reaching from grade stake to grade stake, will permit one to set the proper grade from one stake to another. (Drawing 2a) Dig the area about 4 inches deep, measuring down from the top of the grade stakes.
2. To simplify leveling of sand base and to speed up laying of patio block, connect grade stakes with straight pieces of 1 inch by 4 inch lumber as shown in Drawing 1.
3. To level sand, use a 2 inch X 4 inch lumber to which one has nailed a 1 X 4 inch lumber as shown — long enough to span area to be leveled. Rest ends on side rails and move back and forth to level sand. Complete section, 2 or 3 blocks wide at a time, then move inside rail. The laid blocks then become a sand leveling guide for one side in the new section.
4. Lay patio blocks in pattern desired. Use level frequently. If leveling of block is necessary, force sand under block as shown in Drawing 2b.
5. Brush sand across patio to fill spaces between patio blocks.

The materials and tools needed in the method are carpenter's level, line, 1 X 2 forming lumber, sand and concrete mix.





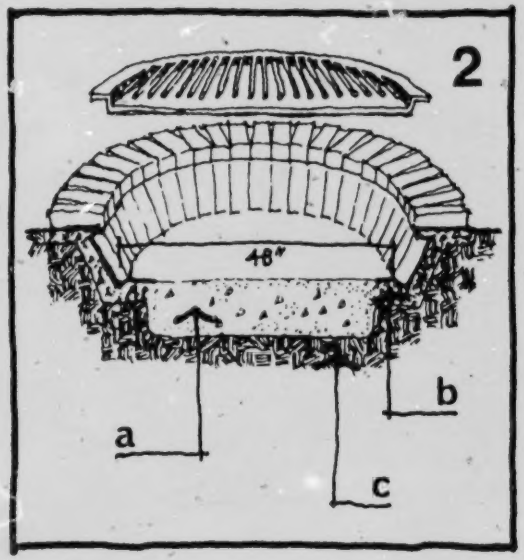
FIRE PIT

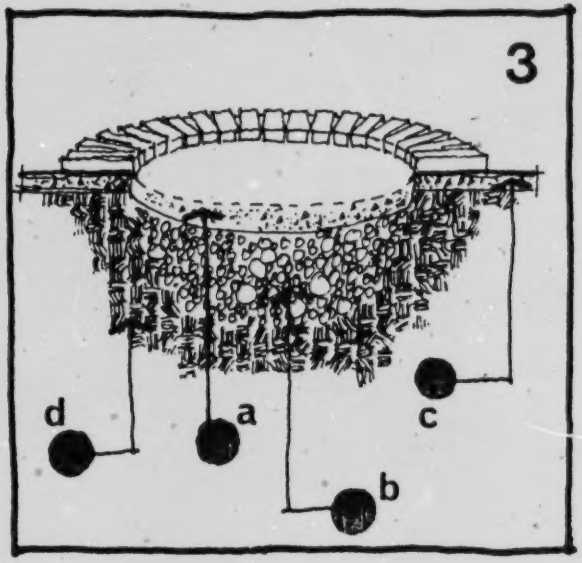
Fire pits are commonly constructed in the backyards of private homes. They are very popular for social gatherings or informal parties. For the same reason, they are always available in public or private camp grounds, where children are the primary users.

Drawing 1: For our long and cold Canadian winter, it is certainly a blessing to have a functioning fire pit in any outdoor recreation area or skating rink. Fire pits can be an amenity in a playground if a safe design is implemented as well as supervision is available. Other than a safe design for the fire pit itself, it is wise to provide some kind of water play feature or sand box adjacent to the fire pit. Both water and sand can be used either to aid cooking, barbecuing or putting out the fire.

Drawing 2: This is a grill covered fire pit. When it is not in use, the opening of this fire pit can be covered with a grill for a safety feature. Bricks are laid in mortar containing fire clay to prevent cracking. A base of sand and gravel helps drainage. For small fires one could use common brick set at grade level for the ring, and fire bricks for the pit lining.
a - sand and gravel.
b — mortar.
c - earth.

Drawing 3: Five foot wide fire pit in concrete. Paved patio provides friendly gathering place. Circle contains thirty-nine Roman bricks set in mortar. Two layers of gravel providing for drainage. People can barbecue over a bed of coals using long handles or skewers.
a — 6 inches of peal gravel.
b — 24 inches of 3/4 gravel.
c — concrete slab or surfacing.
d — earth around the pit.





CHAPTER THREE

Landscaping and Plant Materials

use of plant materials

plant selection procedures

purchasing plant materials

consideration for sites with existing vegetation

construction protection

CHAPTER 3

Chapter three describes the ways in which plant materials, if properly used, can make a valuable contribution to physical comfort by modifying the extreme effects of the local climate. This, however, is not the limit of their usefulness. Trees and shrubs can also be used effectively to organize spaces and activities within the playground by channelling movement and enclosing space. Their generous use will also enhance the public image of the playground and enlarge the total experience of the children.

The material that follows will elaborate upon the use of trees and shrubs on the playground, establish principles to insure their selection, use and allocation will provide for healthy and vigorous growth.

USES OF PLANT MATERIAL:

Well designed playgrounds have a variety of areas oriented to differing ages and activities. Plant materials can be used to sharply delineate these spaces and prevent possible conflict. For example, if it is necessary to organize activities so that a passive sitting area is adjacent to an active boisterous part of the playground, a thick barrier of trees and shrubs can be used to achieve visual and physical separation.

Comfort and privacy are important to children of all ages. A sensitively designed playground recognizes this by providing a variety of spaces away from the prying eyes of others — made secure and interesting by a thick enclosure of trees and shrubs.

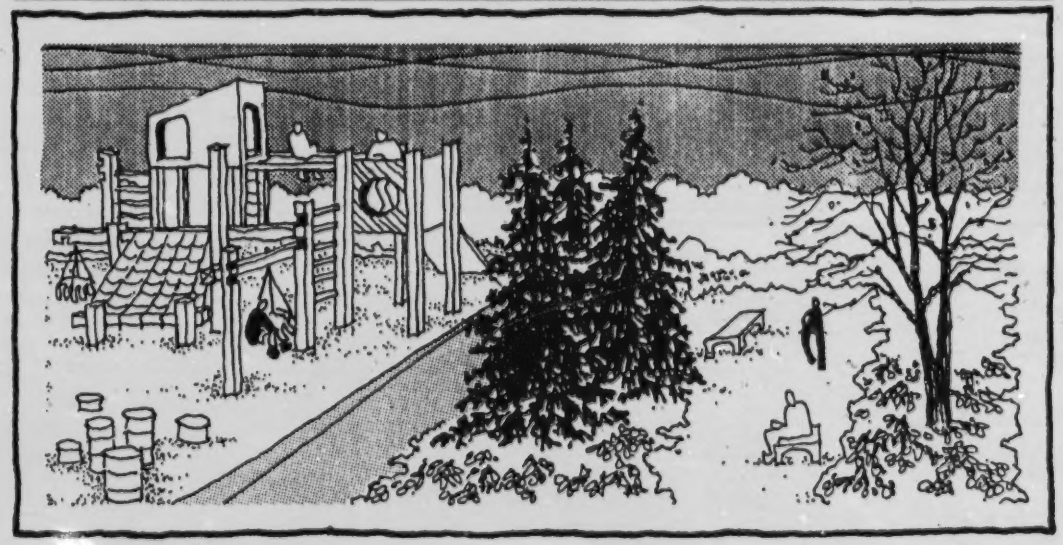
To provide the opportunity for children to enrich their fantasy and drama, it is wise to include an abundance of trees and shrubs that flower profusely or bear an intriguing fruit. On a creative playground the plant material, if carefully chosen, can provide a source of raw materials, which can become the basis of limitless play activities when combined with the imagination of the child.

If the opportunity exists for a playleader on the site, consideration should be given to providing a children's garden. This activity is best allocated to an area of rich, well drained soil and carefully organized to avoid spill-over from the active areas of the playground. It should be placed away from principle circulation routes and provided with a protective enclosure. The vegetables and flowers that the children grow from seed will enlarge their understanding of natural processes, foster a strong sense of accomplishment and pride of ownership.

There are many practical layouts for a playground garden, but the best provide boxes or beds that are easily identified as the property of each child. Certain plants such as sweet potatoes, morning glories and dutchman's pipe, which are easily trained to climb up and over trellises can be developed as play spaces by forming long dark tunnels and complex mazes.

The appearance of the playground, a relatively minor concern to children, is often a source of annoyance to adults whose enthusiasm for order and aesthetics frequently parallels a child's zest for chaos. Although ideal site selection procedures should largely eliminate this response by placing the playgrounds in an area where conflicts are unlikely, the site is frequently predetermined and plant material must be allocated for screening and visual effect. An effective buffer can be created by planting vigorous hedge shrubs around a thick core of trees.

A thick barrier of trees and shrubs can be used to achieve visual and physical separation.



uses of plant materials

PLANT SELECTION PROCEDURES:

Because trees and shrubs are expensive, damage easily and require considerable maintenance, they are frequently ignored by designers and the quality of the playground may suffer as a result. Although choosing the correct species and size and arranging them so as to insure survival is a complex process, with proper care and attention at the planning stage, a more interesting and stimulating playground atmosphere can be achieved.

Remember that trees and shrubs planted in a playground must withstand considerable abuse. Survival is dependent upon a number of factors: the soil, the drainage, the potential damage caused by children at play; and finally, the natural habitat and character of the species.

soil:

Soil tests, which can be made easily with the assistance of the Department of Agriculture, provide information on the quality of the soil and what is required to enrich it or correct its acidity.

Good topsoil is a tremendous asset and should be protected during construction. If the site is to have extensive regrading, and machines are to be used, instruct the operators to scrape the topsoil from the surface in the areas to be affected and reapply it after the contours of the land are finalized.

If the site is on fill or waste land, the topsoil may be very thin, poor or nonexistent, in which case, other sources of topsoil must be found. If soil is to be purchased and brought to the site it should be a fertile, natural clay or sandy loam with at least 2% to 4% minimum organic matter. An acceptable acidity range for most common purposes is, from 6.0 to 7.5 pH.

Inspect the topsoil to determine the extent of extraneous inclusions such as sticks, stones, and clumps of subsoil and reject it if these deleterious substances are excessive. It is also wise to demand that the topsoil be reasonably free of weeds and weed seeds, as they will hamper the growth of newly planted trees and shrubs and greatly increase the maintenance burden. If the topsoil is too acidic, introduce lime; conversely, if it is too basic, add peat moss.

drainage:

Trees and shrubs have definite preferences for soil moisture and very few can tolerate excessive water around the roots as this diminshes the vital supply of oxygen in the soil. Avoid planting any trees or shrubs in low moist areas of the site unless they are wetland species, such as willow or alder.

damage caused by play activity:

Generally, shrubs in dense mass plantings will enjoy longer life and appear healthier and more vigorous than individual specimens. They also benefit from a durable edging material surrounding the bed.

When laying out planting areas on plan, be especially conscious of the less obvious circulation patterns that may lead directly through the bed. Trees must be supported by guy wires or poles when first planted. Trees' chances of survival also improve if they are planted as large as possible and are surrounded by a dense mass of shrubs.

natural habitat and character of the species:

Ideally, after all the foregoing factors have been considered, final selection of the trees and shrubs to be used should be made according to the following criteria: rapid growth, moderate to low nutrient and moisture requirements; high tolerance of air pollution and salt contamination of soil moisture; resistance to heavy compaction; and finally, significant visual interest created by its form, colour or flower. Unfortunately, few trees possess all the right qualities in combination and not all trees are ecologically adapted to the particular site proposed for the playground.

The variety of shrubs available is extremely large and their character and suitability for use on a playground varies widely. To make the selection process easier, many of the more suitable, hardy specimens are grouped below in categories that will give a good indication of their proper use.

moist soils
Alders
Dogwoods
Arctic Willow
Yew
Cedar
Viburnum

shaded conditions
Dogwoods
Hydrangea
Honeysuckles
Oregon Grape
Mock Orange
Alpine Currant
Elders
Spirea
Snowberry
Evonymus
Witch Hazel

polluted city conditions
Amur Maple
Japanese Angelica Tree
Dogwood
Russian Olive
Evonymus
Forsythia
Witch Hazel
Sea Buckthorn
Hydrangea
Privet
Honeysuckle
Juniper
Mock Orange
Sumac
Alpine Currant
Spirea
Lilac
Yews
High Bush Cranberry
Cinquefoil

sandy soils and banks
Russian Olive
Common Sea Buckthorn
Juniper
Beautybush
Privet
Honeysuckle
Sumac
Cinquefoil

attractive flowers and fruits
Flowering Quince
Forsythia
Rose of Sharon
Hydrangea
Beauty Bush
Honeysuckle
Flowering Grape
Mock Orange
Spirea
Lilac
Viburnum
Wiegelas

PURCHASING PLANT MATERIALS:

Before the plant material is actually purchased, it is wise to have some knowledge of the most suitable sources. Patronize, wherever possible, a reputable local nursery and personally tag all trees and shrubs. Mail order sources are available, but they cannot always guarantee a good product and frequently the delivered item only vaguely resembles the advertisement in appearance, size or health. They may also suffer serious damage in shipping.

When purchasing nursery stock, it is also important to have some basic knowledge of what to specify as to size, condition and overall appearance. Be aware that the cost of trees and shrubs rises with size, and while it is wise to purchase stock as large as possible, a balance must be achieved between the budget and the requirements of the planting concept. The Canadian Nursery Trades Association issues a standard specification for nursery grown stock and reference to it will help you judge the quality of the plant material received.

CONSIDERATIONS FOR SITES WITH EXISTING VEGETATION:

As shown in Chapter One, it is advantageous to select a site that has the elements of a mature landscape in the form of well-grown trees and shrubs; however, once the design process commences, it is critical to have an understanding of construction and layout procedures that will ensure all existing plant material remains healthy and vigorous and is distributed so as to make the maximum possible contribution to the character and atmosphere of the new playground.

It is rare for a tree species to be completely tolerant of heavy traffic, vehicular or pedestrian, over its roots. The roots of the tree close to the trunk are primarily stabilizers, while the light fibrous roots grouped at the perimeter under the drip line are the most fragile and require undisturbed access to moisture, air and nutrients. It is these fibrous roots that must be protected vigorously.

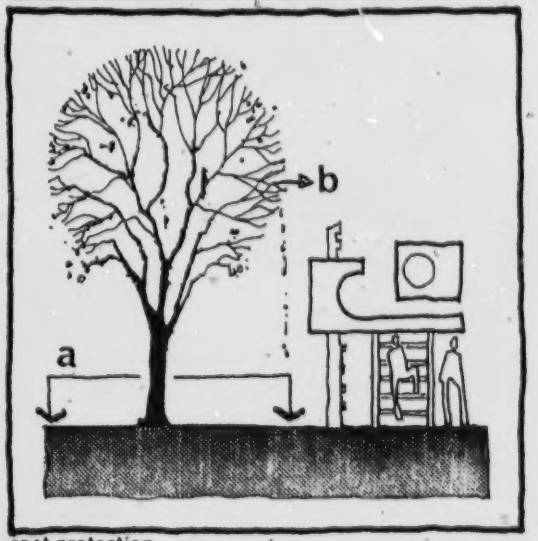
By observing the following rules in the layout of activity areas at the design stage, it is possible to prevent the compaction of the soils about the roots and in large measure ensure survival of all existing trees.

Pathway and circulation alignments that come within the drip line perimeter should be avoided unless no other choice exists. If movement must be accommodated within this area, the use of gravel, sand or wood chips as a ground texture rather than asphalt or concrete is encouraged, as the former will allow the oxygen required by the tree's roots to circulate and penetrate the soil.

Activity areas, especially those involving spontaneous and loosely controlled water play, should be avoided under most trees. A wise first step in the design process is to identify all tree species on the site and designate for special care all those intolerant of compaction.

A. Zone of protection — no footings, cut, fill or paths if possible

B. Drip line



root protection

CHAPTER FOUR
Case Demonstrations

site selection list

three prototypical cases

CHAPTER 4

All material in this chapter is prepared with three objectives.

One, to stimulate creative utilization of available or potential sites for playgrounds where children and parents may share their common interest, care and discovery.

Two, to summarize the use of physical planning and design principles through different situations in urban, suburban and natural environments.

Three, to simulate the adaption of certain play-scape ideas in each prototypical site, so community groups may have a better understanding of play-grounds as valuable for exploratory education, and diversified services for adults and children.

The chapter itself is organized into two parts, Site Selection List and Three Prototypical Cases. The Selection List is a simple check list which allows community groups to start an initial selection of potential sites. The Prototypical Cases are examples which illustrate the manipulation of certain design principles and the organization of function and forms; (so the basic processes and product of play-ground design may be understood.) However, we have to make several assumptive requirements and conditions in order to define the limits and poten-tials of the different cases. Consequently, all sche-matic products reflect the characteristics of the environments for which these playgrounds are designed.

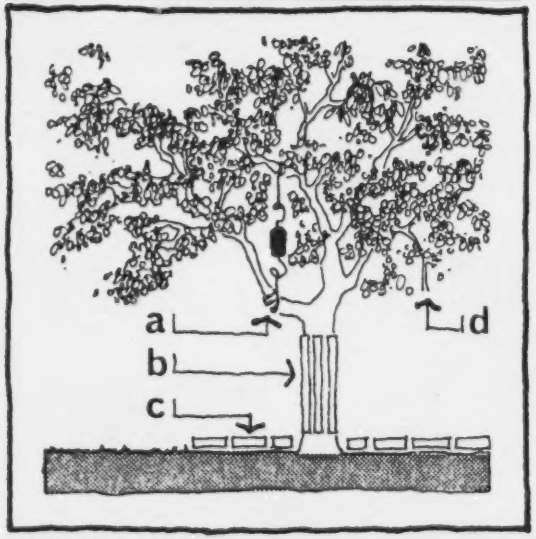
CONSTRUCTION PROTECTION:

A. Low hanging branches supported

B. Vertical boards protecting trunk

C. Bricks at base to distribute weight and permit air penetration

D. Avoid winching equipment and structures by attaching lines to branches



construction protection

Whether the actual construction is to be carried out by a contractor, a local work crew with rented equipment or a combination of both, be certain to observe the following rules in order that existing trees are protected during this crucial stage of operations. Advise the contractor that he is bound to follow your instructions and insist upon a penalty for each tree damaged or destroyed.

Protect all trees on the work site by fencing with hoardings or snowfence. Place the fence so as to restrict traffic within 40' of the trunk. If heavy traffic must be permitted next to the trunk, armour the tree with vertical 2 by 4 boards nailed together and place bricks on the ground at the base as shown in the illustration to absorb and distribute weight and permit air circulation.

Trees and shrubs in clumps should be fenced en masse and any low hanging brances in movement areas should be supported or fenced to ensure they are not torn off by vehicles. No wires should be attached to trees for the purposes of winching equipment or to aid the construction process in any way. Fires should not be located within 50' of existing trees nor should anything be piled or stored at the base of a tree. The emptying or flushing of concrete making equipment, paint cans, etc., should never take place under a tree to be preserved. Finally, any limbs or roots cut during construction should be coated with non-toxic tree paint solution.

SITE SELECTION LIST

If one takes a careful look at his own neighbourhood, he will somehow discover that there are many sites which could be utilized for an exciting playing and learning environment. These potential sites are undoubtedly located in any urban, suburban, or rural areas. For the ease of communication, we generally categorize them in the following chart which may be adopted for one's initial planning purpose.

type of environment	potential sites
Urban	1. park space/ religious or institutional properties/ urban plaza. 2. street/ mall/ empty lot/ common laneway or backyards/ market places. 3. school properties/ apartment sites. 4. deserted industrial properties.
Suburban	1. community centre/ library/ school site. 2. parkette/ major open space corridors. 3. abandoned transportation or utility lines. 4. shopping centre/ industrial park. 5. continuous backyard properties in residential areas. 6. church and hospital properties.
Rural	1. open field, (declined)/ ravine/ beach. 2. deserted orchard/ vineyard/ farmstead/ pasture. 3. forest land/ wood lot/ conservation property.

THREE PROTOTYPICAL CASES

The primary purpose of demonstrating the follow-
g three cases is to show one of the many ap-
roaches in playground design. It is not meant to be
sed as the only means nor to encourage direct
uplication of the products.

Before we discuss these three cases of design in
etail, it is very critical to clarify three basic consid-
rations of design process:

1. Goal and Theme, 2. Physical conditions and requirements, 3. Conceptual Organization.

oal and theme

Goal is a series of objectives determined by social-
olitical demands and financial capability. It usu-
lly defines the scope of services and products. In
ost cases, goal is established from the following
ssues.

1. Who are the users or who will be benefitted by the playground?
2. In what way will they be served?
3. What are the financial requirements to accomplish it or how can it be provided within the current financial limits?
4. How much time, labour and resources are required to build, manage and maintain the playground?

Theme is a basic framework of ideas which forms
he atmosphere and excitement of the playground.
is this consideration that generates innovative
oncepts which make the planned playground dif-
erent from the conventional products. Sometimes,
heme is simply a capture of the characteristics of
he neighbourhood. Other times, it is a contrast of
he surrounding environment. In either case, a
asic way to discover the theme is to utilize a new
pproach of design, potential features in the site, or
ocial activities and programme available in the
rea.

physical conditions and requirements

All sites have their own potentials and constraints. They are combinations of natural and man-made facts that all designers have to work with; for example, a steep slope or existing underground utility could be advantageous as well as disadvantageous. Nevertheless, both of them are factual concerns. This type of finite factor in any site is considered as a physical condition. There is another type of factor which is by no means tangible, yet very influential — namely requirements or standards. These are determined by administrative, legislative, safety and maintenance concerns. For example, municipal standards or bylaws regarding recreation development can be considered a requirement. Most of them seem to be very rigid, due to the need of enforcement for the commonwealth of the general public. However, they could be negotiable if one can build a logical argument for change or adjustment.

Physical conditions and requirements vary from place to place and case to case. There is no universal standard, one can use again and again. Dealing with them is the most challenging aspect in playground planning and design. In fact, a successful development of playground is heavily reliant upon how well a community group can define and manipulate this consideration.

conceptual organization

Conceptual organization is a consideration that logically follows the study of physical conditions and requirements. Basically, it involves providing physical solutions to the defined needs, demands or problems. Most conventional designers like to spend a lot of time in this area before they can clearly identify the actual problems. Consequently, the result of their design can often tend to be impractical or egotistical.

In our opinion, the consideration of conceptual organization should be logically derived from careful studies of the social-political situations, the financial capability, and the physical conditions and requirements of any project. It usually presents itself with several alternative solutions which can be sketched out as different schemes. The greatest effort required is to get the participating community group together to select one final scheme for implementation.

The elements involved in this consideration primarily are circulation, use of space, design of playscape, landscaping, maintenance facilities as well as privacy and safety controls. The key is to make these elements work for each other, so maximum advantage can be provided through a skillful integration. For example:

1. Locating pedestrian circulation through the playground or along certain play areas, can help to increase supervision, promoting playground image as well as providing convenience to the public.
2. Providing maintenance facility such as water outlet adjacent to the play area can encourage water play.
3. Landscaping around an active play area and along pathways can provide shade in summer, windbreak in winter and a pleasant view in all seasons. It can be also integrated with sitting area as natural buffer for privacy control.

Realizing that the complicated social-political and financial situations differ from place to place, we decided to demonstrate only the physical concerns of playground design; so community groups may clearly grasp the thinking process evolved in these three cases. It also should be understood that we assume all non-physical concerns are favourable for the design. Nevertheless, we still strongly recommend a conscious effort to identify and respect the social-political and financial aspects of any project which is currently undertaken by community groups.

URBAN (LOT) SITE CASE 1

A site located somewhere in an ordinary residential zone in a city or town. Size of land equivalent to two average city lots.

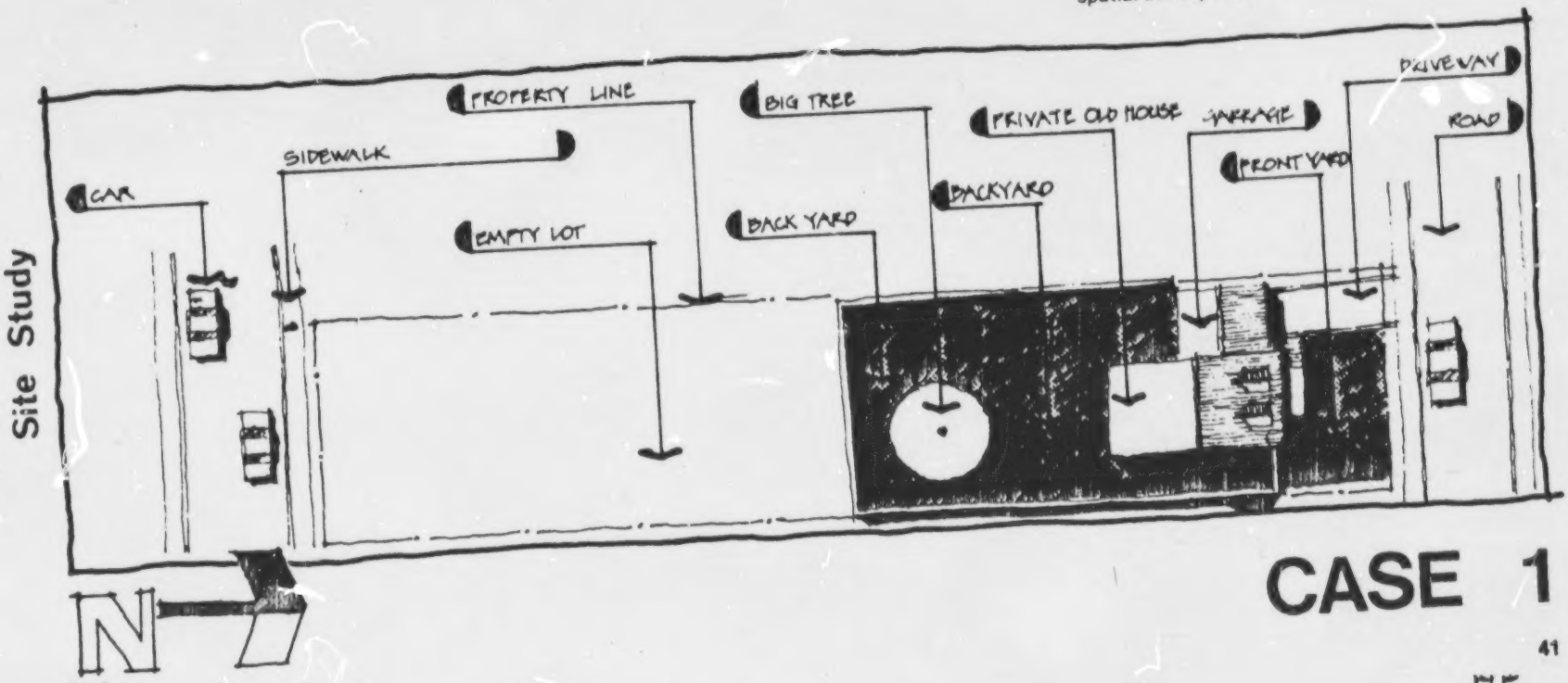
goal and theme

Goal:

1. To create a play environment providing diversified experiences.
2. To encourage adult participation and use with children.
3. To provide an outdoor recreational park for the adjacent urban neighbourhood.

Theme:

1. The playground will consist of active and passive areas which will have reflecting characteristics of the urban environment.
2. Dominant visual features in the site will be sculptural form of playscapes and plant materials.
3. Elevation changes will be the key control of spatial atmosphere.



CASE 1

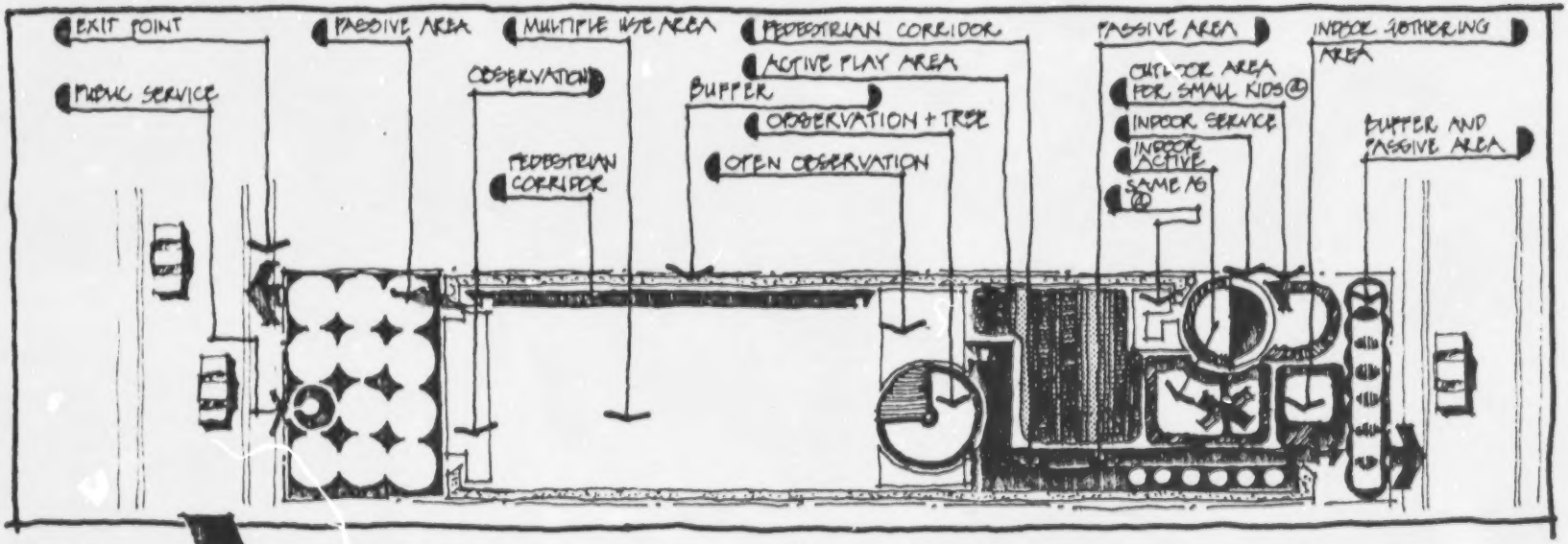
74

75

physical condition and requirement

1. Playground has to serve the neighbourhood of 100-200 children.
2. Available lot size for this development is (40 ft x 200 ft) 8,000 sq. ft. and owned by municipality.
3. The land is flat with an old house in the Northern lot.
4. There are two, oneway streets which run East and West at North as well as the South end of the property. There are sidewalks on both sides of the streets.
5. Existing residences are located at East and West sides of the lot.
6. Pedestrian circulation crossing the lot must be provided to connect two s[illegible]ets.
7. Lighting and night use are required.
8. Visually, it shall be an amenity for the neighbourhood.
9. Definite circulation control within the site limit is required. All active play adjacent to roads shall be discouraged or eliminated.
10. Property definition must be well considered and controlled, so user can not trespass upon the adjacent private properties.

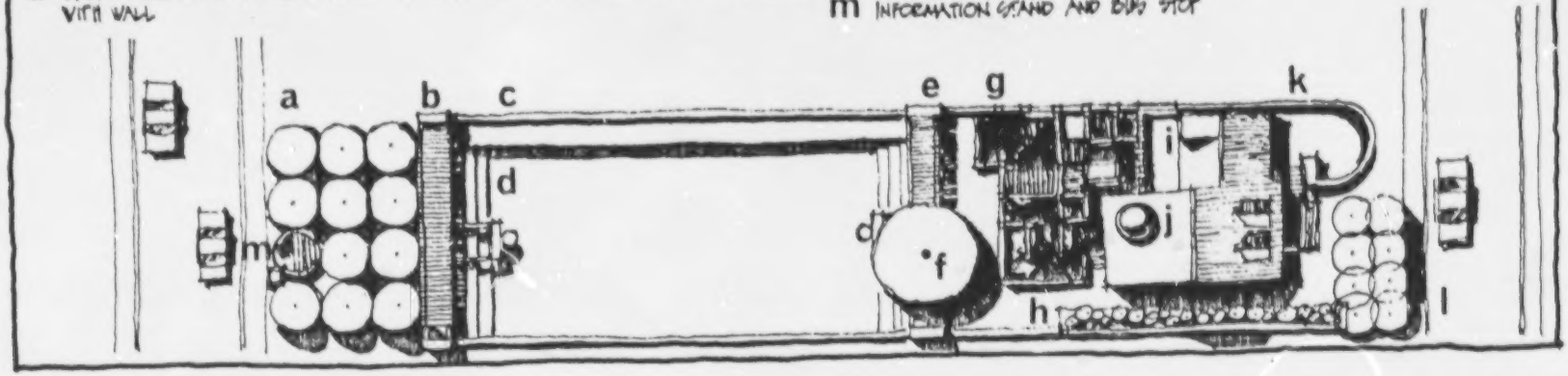
Conceptual Organization

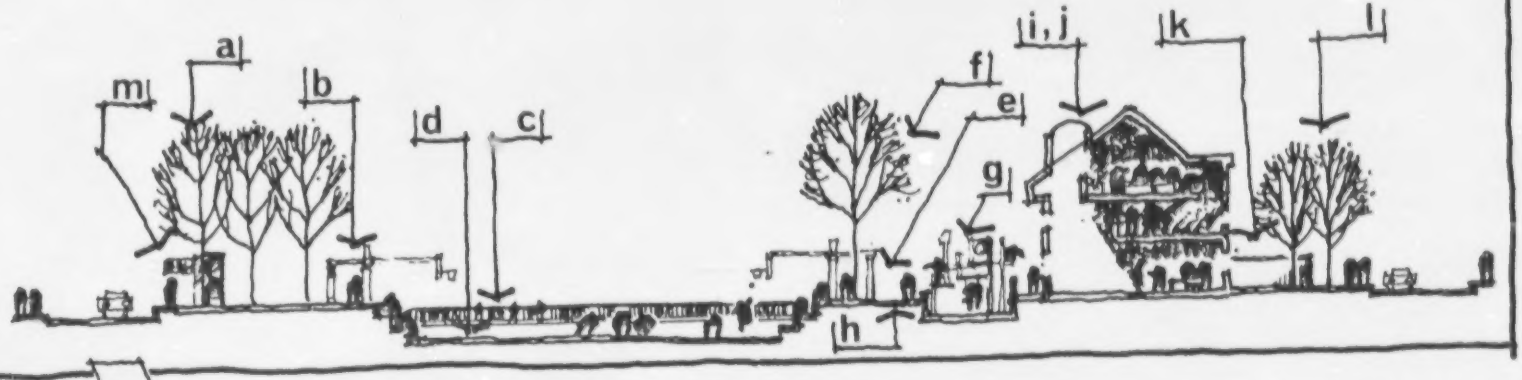


CASE 1

Design Scheme

a ENTRANCE WITH TREES
b COVERED OBSERVATION STAND
c WALK WAY WITH LOW WALL
d SPORT AREA AND AMPHITHEATER WITH WALL
e SOUTHERN OBSERVATION SAND
f PRESERVED BIG TREE AND SITTING AREA
g ACTIVE CREATIVE PLAY AREA
h WALK WAY WITH SITTING AREA AND WALL
i INDOOR DAY CARE AREA
j INDOOR MEETING ROOM AND WORKSHOP SPACE
k OUTDOOR ENCLOSED PLAY AREA FOR SMALL CHILDREN
l OUTDOOR SITTING AREA AND ENTRANCE
m INFORMATION STAND AND BUS STOP





CASE 1

SUBURBAN SITE CASE 2

A site located somewhere in a subdivision, related to an open space corridor. Size of land equivalent to one standard suburban lot.

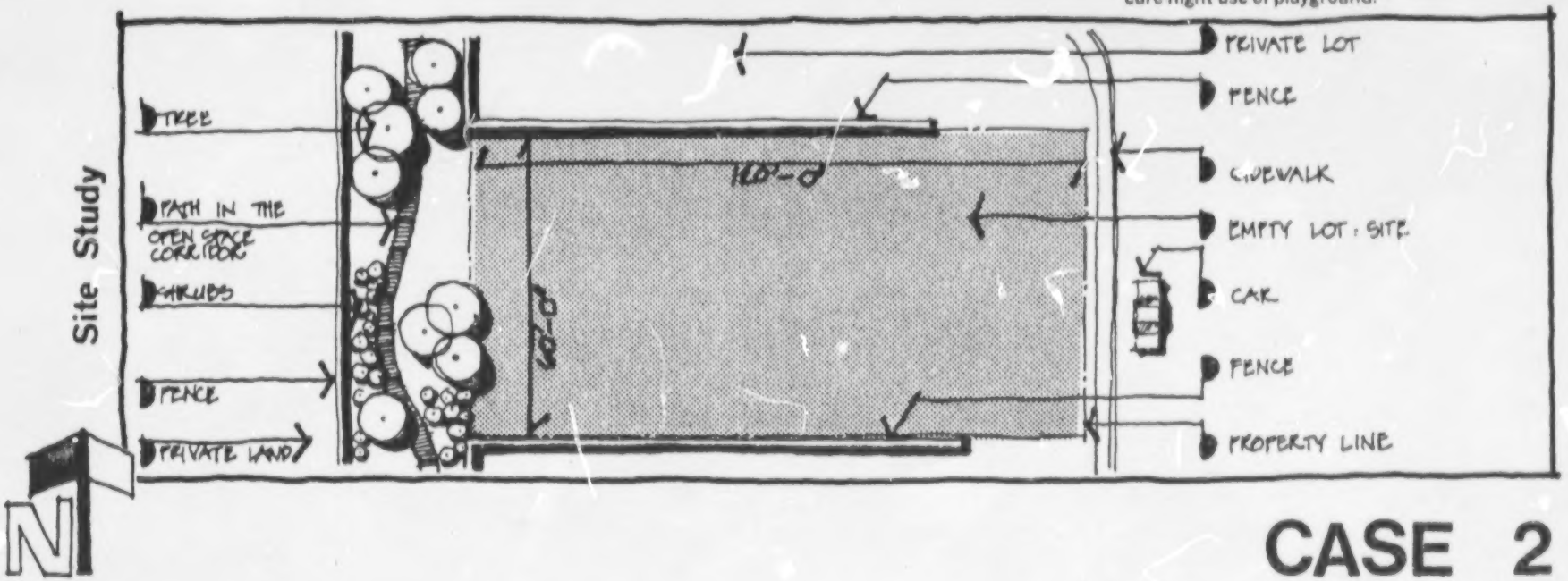
goal and theme

Goal:

1. To develop a children's playground as an integrated part of the open space corridor in an average housing area.
2. To maximize the use of corridor and playground by all age groups.
3. To create pleasant landscape as a visual focus of the neighbourhood.

Theme:

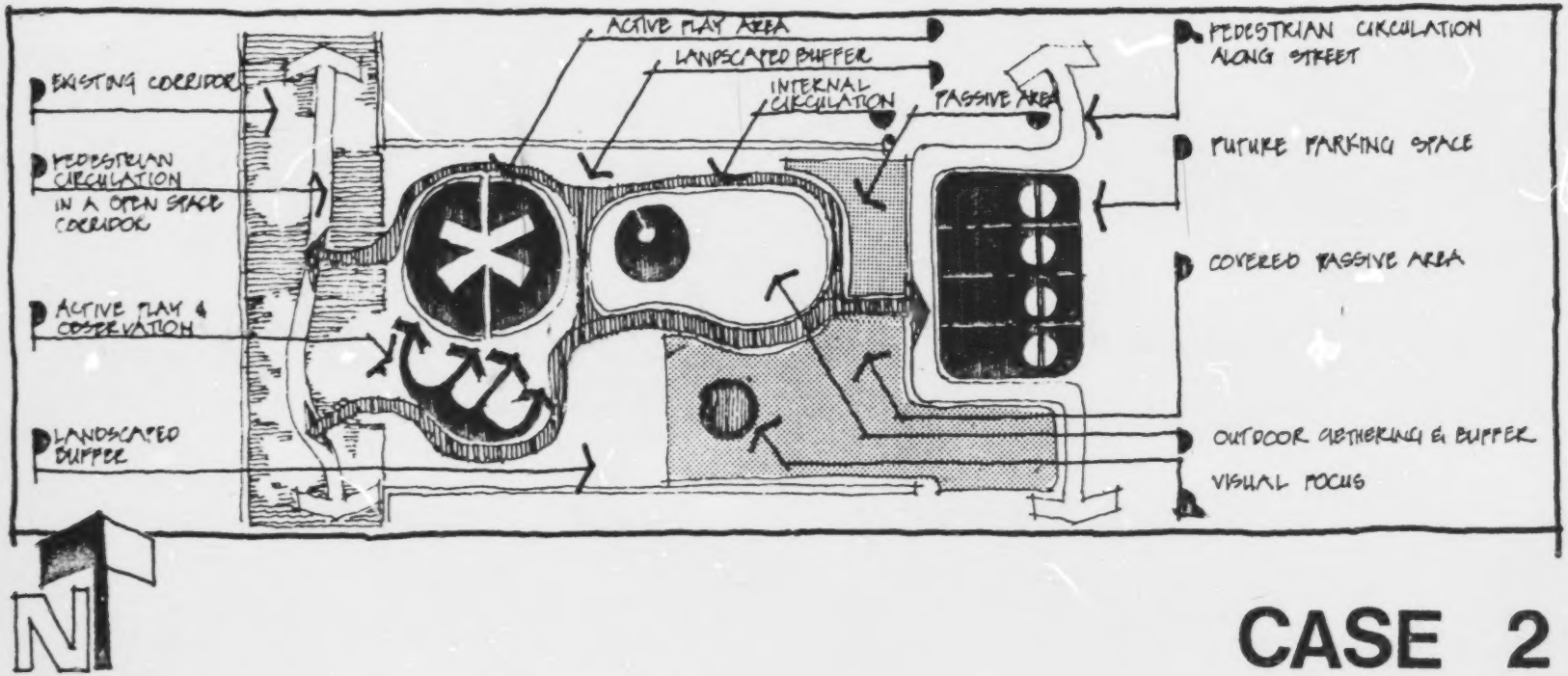
1. Play areas will be designed to encourage dynamic activities of seasonal use.
2. Landscaping in the site will capture the natural beauty which is lacking in the neighbourhood.
3. Artificial landforms will be utilized to define activity areas and control privacy.
4. Special lighting effect will be provided to secure night use of playground.



CASE 2

physical conditions and requirements

1. This playground shall be a part of an open space corridor which is currently serving 200 families of average 1.5 children per family.
2. Area designated for the playground is 7200 sq. ft.
3. Physical characteristic of the site is open and flat.
4. The limits of the playground site and open space corridor must be fenced to ensure the privacy of adjacent residents.
5. There is a two-way traffic street at one end of the playground site and a minimum of 4 to 5 visitor parking spaces are needed.
6. It is required to control the pedestrian circulation at West end of the site as well as vehicular traffic. 7. View from the road to the playground must be attractive, so it could be one focus point in the streetscape.



CASE 2

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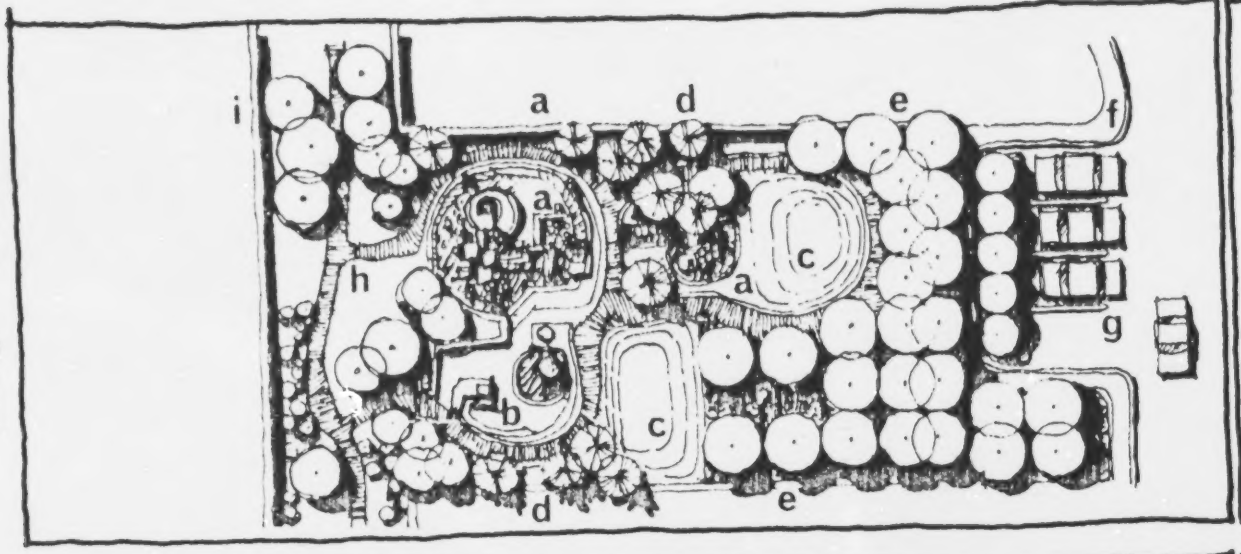


a • ACTIVE PLAY AREAS CREATIVE PLAY STRUCTURE CONNECTION BY TUNNEL

b • SPECTATOR AREA AND WATER PLAY AREA

c • LANDFORM GRASS SITTING AREA

d • BUFFER WITH TREES

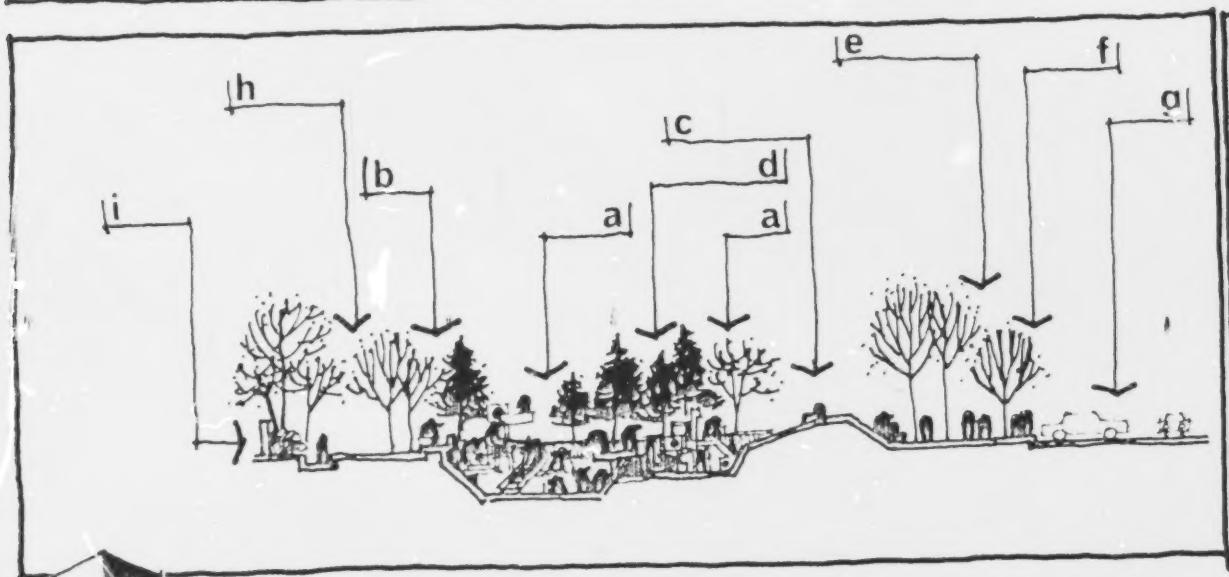
e • ENTRANCE TO THE SITE, COVERED BY TREES. PASSIVE ACTIVITY ZONE.

f • NEW SIDEWALK, ADJACENT TO PARKING AND ENTRANCE PLAZA.

g • 4 VISITOR PARKING SPACES.

h • NEW PATH SYSTEM

i • EXISTING OPEN SPACE



CASE 2

RURAL SITE CASE 3

A site located in a senior public school property where athletic field and natural amenties are available. Size of land is equivalent to 30 standard parking spaces.

goal and theme

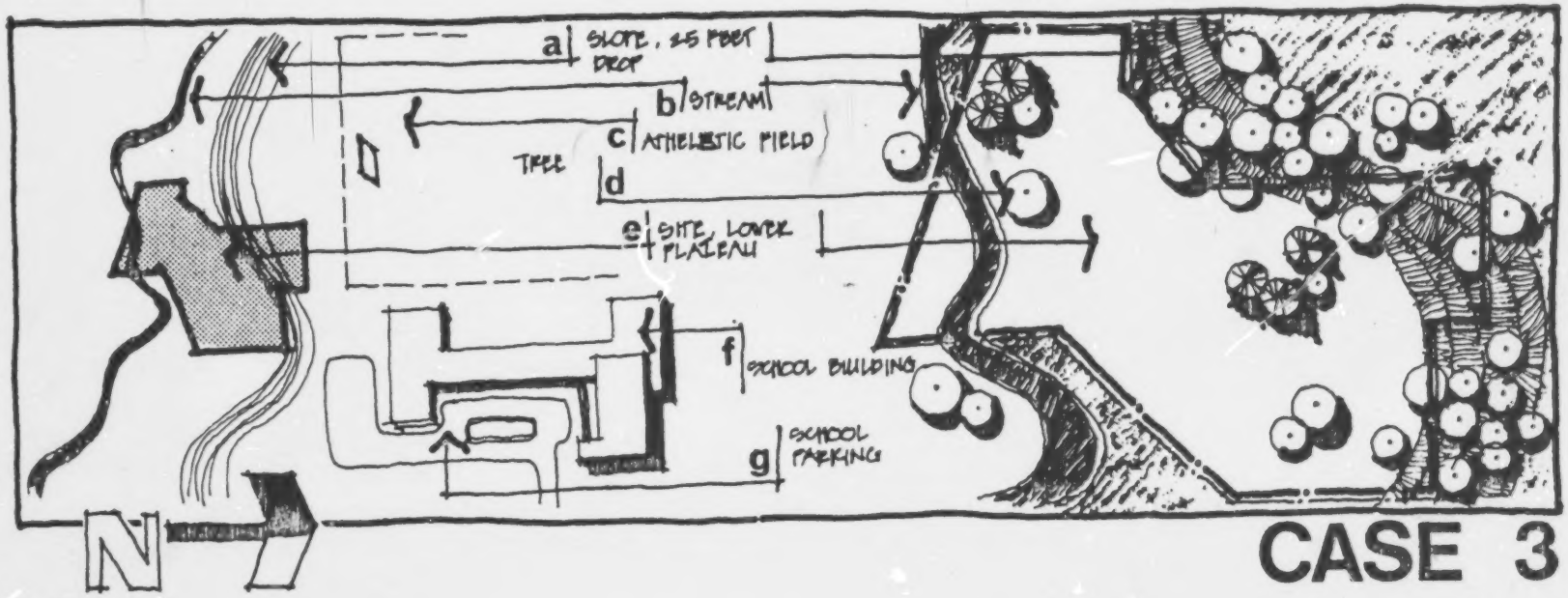
Goal:

1. To integrate a compact creative playground in the school field with respect to the adjacent natural features.
2. To extend children's learning and playing experiences from classroom and sportfield to a natural ravine.
3. To encourage adult participation with children in the future playground and existing school field after school hours and holidays.

Theme:

1. Natural scenery will be preserved as the background of the play environment.
2. Seasonal uses will be the key to the future development.
3. Water play will be the major interest.
4. The rural characteristics of woodland and farmland will be carefully portrayed as the overall atmosphere of the place.

Site Study



CASE 3

physical conditions and requirements

1. The shape of the site is irregular and the size is roughly 5400 sq. ft.
2. The site is covered by 20% of stream and wetland, 38% of open field and 40% of woodlot.
3. There is a significant change of topography in one side of the open field and the woodlot.
4. There is a path allowance for nature-walk on the other side of the stream opposite to the future playground.
5. The site is located on one side of the (school) sportfield and very close to the school building where staff and visitor parking is available.
6. It is necessary to establish a buffer area between the active play zone and stream edge.
7. A path network is required to define pedestrian circulation and exit points.
8. A connection with two sides of the stream shall be established to encourage pleasure walking, sitting and out-teaching purposes.
9. Active play area must be confined to avoid disturbance of ecological features.

Conceptual Organization

a CREATIVE PLAY AREA: ACTIVE PLAY AMONG TREES

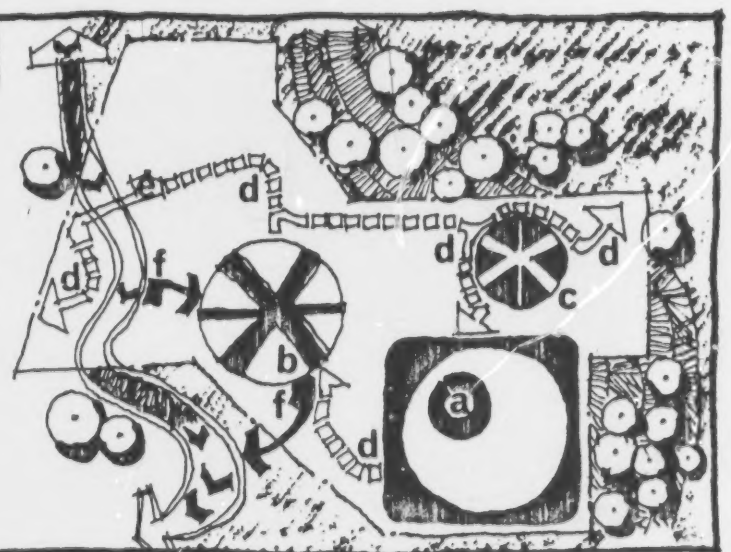
b WATER PLAY AREA, LINKED BY PLAYSCAPES OF CREATIVE PLAY AREA

c OBSERVATION AND PASSIVE ACTIVITY AREA.

d CIRCULATION PATTERN WITHIN THE PLAYGROUND

e CROSSING POINT. CONNECTION BETWEEN TWO SIDES OF STREAM.

f INLET AND OUTLET SYSTEM OF WATER PLAY AREA.



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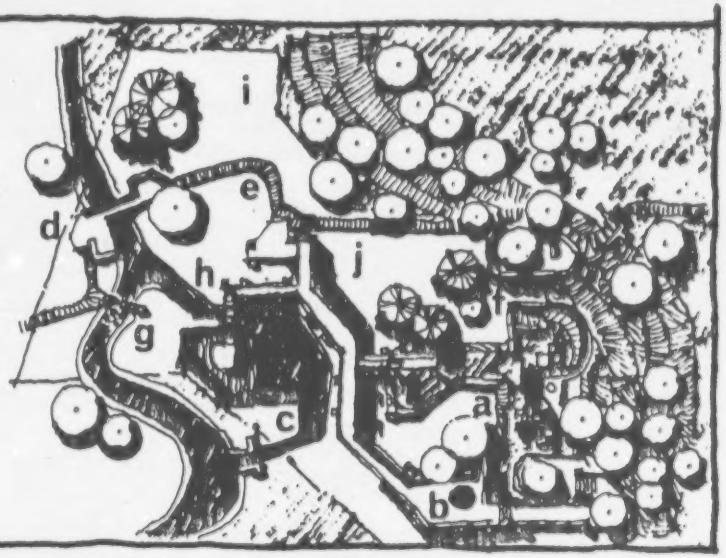
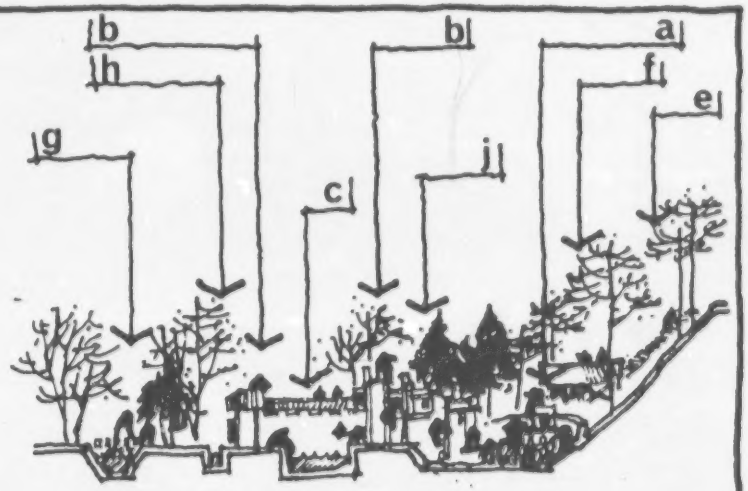
CASE 3

a CREATIVE PLAY COMPLEX.
b ON GRADE AND FIT PLAY BRIDGE. ATTACH PLAYSCAPE ALONG AS WELL AS A OBSERVATION CORRIDOR CONNECTING WATER PLAY TO CREATIVE PLAY COMPLEX.
c WATER PLAY. SHALLOW POND WITH A ISLAND
d BRIDGE AND SITTING AREA ON BOTH END OF THE CROSSING
e WALKWAY CONNECTING ALL FOCUS POINTS IN THE PLAY PARK
f OBSERVATION PLATFORM ON HILLSIDE. A SITTING AREA AS WELL
g MAN MADE CASCADE. SECONDARY CROSSING
h CHANNEL OF WATER. LEADS WATER TO THE PLAY POND.
i OPEN SPACE FOR PICNIC
j GRASS AREA FOR PASSIVE ACTIVITY; SITTING, READING





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CASE 3

APPENDICES

A cost estimating

B technical data and information

APPENDIX A

There are four essential things to be aware of in estimating the cost of a proposed playground. First, the advantages of accurate and thorough scale drawings; second, the proper units to be used in the estimate; third; hidden or uncontemplated costs; and finally the advantages and disadvantages of acquiring a contractor or skilled labour for all or part of the project.

drawings:

The preparation of scaled drawings of the playground by someone skilled in working drawings is very important. While the playground can be constructued without them, accurate estimates of quantities and hence costs are nearly impossible. This may lead to critical shortages, or perhaps worse, wastage of valuable materials. If contractors are involved they will likely insist upon such drawings for their protection.

Clear working drawings will also serve to protect the owners in the event of a dispute with the contractor.

measuring units:

The units to be used in cost estimating will generally be either cubic, square, unit or linear measures.

Cubic measures are often used for such things as concrete retaining walls. The mass of almost any such irregular shaped objects can be reduced to its component geometry and the sum of these elementary volume calcualtions multiplied by the unit cost of the materials to establish total cost.

Square measures are applied to almost any large surgace that has a consistent cross section, for example concrete and asphalt walk surfaces. Again by totalling the areas of the geometric components of the surface and multiplying the unit cost we establish the total price.

Linear measures are self explanatory. They include lumber, rope, pipe and similar materials. They may also be applied to such things as curbs or retaining walls with consistent cross sections, but usually only if the price reflects installation by a contractor. Rather than calculate the total volume of materials they are generally sufficiently experienced to quote the total cost on a linear basis.

Unit costs apply to one of a kind items such as play equipment that is purchased from manufacturers, but may also be used to describe the price of trees if they are to be installed by a nursery or landscape contractor.

hidden or uncontemplated cost:

Mistakes frequently arise in cost estimating when the "real" cost is not accounted for. For example, the cost of a retaining wall made out of railway ties is comprised not only of the timbers in the fact of the wall, but several other significant items such as: ties used as deadmen behind the wall, gravel layers to ensure proper drainage, long metal spikes, and wood preservatives applied to exposed and grains. Another cost that may not be immediately apparent is that of acquiring the necessary equipment and tools to complete the work. Whether they are rented or purchased this cost must be entered in the total cost calculation

contractors vs community labour:

There is no question that appreciable savings accrue when volunteer labour is used for construction. However, it may be advisable to assume extra cost in certain circumstances, particularly when the requisite skills are not at hand in the community labour force. By using a contractor to do conrete forming for example, money may be saved by eliminating waste. A contractor will almost certainly produce a higher quality of work that by enduring longer will prove more economical.

This table reflects the unit cost of the materials commonly used in constructing playgrounds. The reader is cautioned to use these prices only as a guide in cost estimating because the information is based upon survey information gathered in the Metropolitan Toronto Region during October 1977. Regional price differences and the inevitable inflation of price over time should be accounted for in any final estimates of final cost.

table a

Materials	Unit Size	Cost	
WOOD			
Cedar			
2x4	lin. ft.	.30	
2x6	lin. ft.	.56	
2x8	lin. ft.	.75	
2x10	lin. ft.	.95	
2x12	lin. ft.	1.15	
4x4	lin. ft.	.62	
6x6	lin. ft.	2.00	
1x4	lin. ft.	.19	
1x6 tongue & groove	lin. ft.	.60	
Jack pine (Timer-treated with preservative)			
4x6	lin. ft.	.95	
6x6	lin. ft.	1.35	
6x8	lin. ft.	2.00	
8x8	lin. ft.	2.55	
Other Poles			
Jack pine	25' x 5" top diameter	$50.00 (treated) 30.00-35.00 (untreated)	
Railroad ties – used	8 ft. sec.	$ 8.50 each	
Cedar logs	lin. ft. x 6" diameter	.75	
SOD	12" x 36" strip	.65 to .75	
Fertilizer	40 lb. bag	9.00	
CRUSHED STONE (used as base material for concrete and asphalt surfaces. Prices are highly variable depending on delivery.)		delivered	direct from quarry
3/4"	ton	4.75	2.25
2"	ton	4.70	2.25
screenings (fine grained materials used on paths)	ton	4.70	2.25

95

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Material	Unit Size	Cost	
Gravel – Pit run (Pit-run means gravel formed by natural processes – quarried unwashed)		delivered	direct from quarry
	cubic yard	7.00	3.00
Sand			
Brick sand	ton		3.50
Concrete sand	ton		3.25
Sand fill (not suitable for sand box)	ton		1.00
Asphalt			
H L 3 (base material)	ton	16.75	
H L 2 (finished material)	ton	18.25	
Cold mix (for repair)	ton	19.00	
Concrete Block	8 x 8" x 6"	1.40	
	10" x 8" x 6"	1.40	
Concrete Pipe (items 1-3 used for drainage) (items 4-5 used for play equipment)			
		with gaskets	
1. 6"	lin. ft.	6.00	
2. 8"	lin. ft.	7.00	
3. 10"	lin. ft.	9.00	
4. 48"	8 ft. section	45.00	
5. 72"	8 ft. section	60.00	
Concrete Pavers			
Interlocking paving stones	sq. ft.	2.00-3.00 (including base)	
Patio stones	24" x 24"	2.50	
	12" x 24"	2.00	
Precast Concrete Slabs			
3' x 6" x 6"	lin. ft.	1.40	
6' x 6" x 6"	lin. ft.	1.40	

Material	Unit Size	Cost
Oil Drums (used) (purchase only clean drums – avoid toxic substances)		20.00 each
Weeping Tiles used to drain damp areas of the site.		1.80 each
Netting (cost of materials only)		2.70 to 3.10 per sq. ft.

Fences	Unit Size	Cost	Remarks
Chain-link	lin. ft.	9.00-10.00	
Board fence			
6' high	lin. ft.	15.00	double sided
4' 9" high		12.00	double sided
4' 9" high		9.00	alternate boards

Walls

Free standing concrete (poured) with reinforcing	sq. ft.	7.50	
Free standing concrete block wall	sq. ft.	2.50-3.00	not including foundations

Stairs

Concrete	cu. yd.	120.00-135.00	includes reinforcing

#when costing include stair surfaces, reinforcing and foundations

Wood – refer to woodwork section

Soils

Topsoil	cu. yd.	8.50-9.00	supplied and placed
Sand	cu. yd.	5.00-5.50	mixed with sawdust and placed
Peat moss	cu. yd.	8.50-9.00	bulk fence (# highly variable item)
Gravel	cu. yd.	9.00-10.00	delivered and placed

Excavations	Unit Size	Cost	Remarks
Hand	cu. yd.		
Sand		16.00	
Clay		30.00	
Machine	cu. yd.	5.00	only a guide

Rough Grading (smoothing land surface before sodding etc.)

Hand	sq. yd.	2.00	
Machine	sq. yd.	.50	depends upon efficiency of machine and job size

Sod

12" x 36" rolled strips	sq. yd.	1.50-2.00	includes delivery if small quantity

3 = sq. yd.

Plant Materials

Trees (1) rough calculation wholesale price x 2 = planted cost

(2) precise calculation
1) wholesale price
2) mark-up and guarantee 50-80%
3) installation materials approx. 1 cu. yd. of topsoil mixture
4) hardward (cables, stakes, etc.)

Total price

Shrubs

About 3.5 - 4 x wholesale price.

Benches	Unit Size	Cost	Remarks
		125.00	
Wood plank on concrete base	6' long	150.00	with back post

Lights	Unit Size	Cost	Remarks
per light standard on 10' pole		800.00-1,000.00	installed
Catch basins (concrete)		500.00- 700.00	plus connections

Pipe

P.V.C. plaster pipe 3" diameter	lin. ft.	4.00-5.00	for irrigation
Concrete pipe 6", 8", 10"	lin. ft.	12.00, 15.00 & 18.00	in place
Weeping tile	lin. ft.	5.00-6.00	placed 2' down

APPENDIX B

To possess a rudimentary understanding of how to read contour diagrams, the designer should be aware of the functional limitations of various slope ranges and be prepared to present a clear graphic representation of the grading and drainage concept.

The following are the relevant characteristics of contour lines:

1. Any point on the contour line is an equal elevation above the same reference point.
2. Evenly spaced contours represent a uniform slope.
3. As contour lines get closer together, the slope increases.
4. Contour lines point up streams, swales and river valleys; they point down ridges.
5. The lines never cross, merge, or split.
6. High points and low points are usually indicated with a spot elevation.
7. Run-off flows downhill perpendicular to contour lines.

The accompanying contour map shows these characteristics in graphic form.

Slopes and grades are commonly described in percentage terms according to the following simple formula:

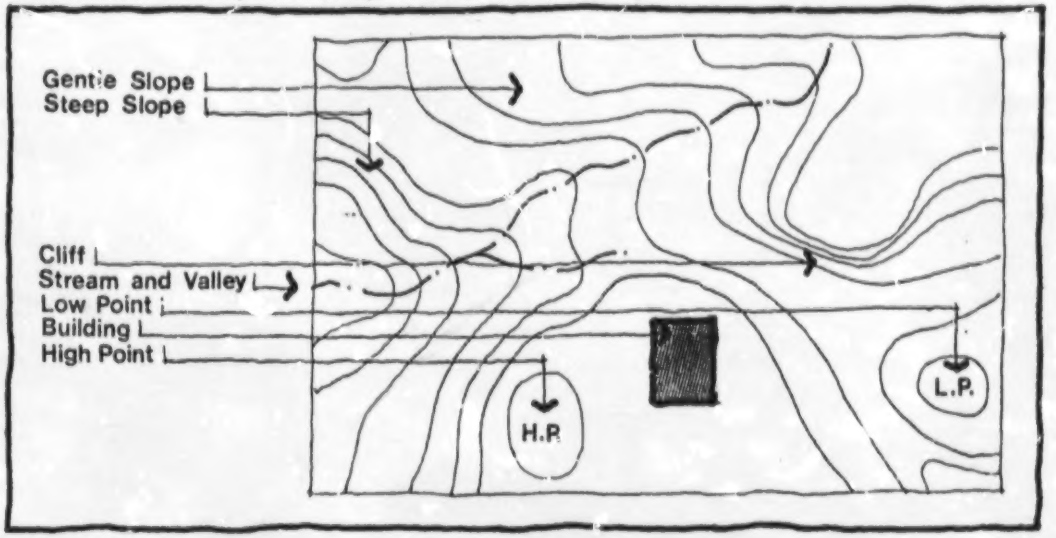
$$\frac{\text{RISE}}{\text{RUN}} \times 100 = x\%$$

Thus, if a slope rise vertically three feet for every ten feet horizontally the slope is described as thirty percent.

technical data:

1. Steps to conquer grades. Apply formula 2 x Riser plus Thread = 26. Use six of seven inch risers and fourteen to sixteen inch threads for best results.
2. Note — one step is usually unsafe as it is not easily seen, thereby becoming an obstacle.
3. Steps, unlike play apparatus, should not be scaled to children's body sizes as they are accustomed to adult-size steps and may misjudge smaller ones.
4. Five or more steps should have a handrail for safety.
5. Ramps should be avoided if possible. Grades should be less than six percent if possible and the length of the ramp should be at least six feet. The maximum tolerable grade is ten percent.*

*See *landform section for discussion of grade percentages.*



contour map

MINISTRY OF CULTURE AND RECREATION

The Ministry of Culture and Recreation is actively involved in acquiring and/or developing useful resources relative to children's play. The ministry's Resource Centre now houses books, pamphlets and films, as well as slide and tape shows on many aspects of children's play. These materials may be borrowed by interested organizations and community groups. Other ministry publications dealing with play leadership and program ideas are available. Besides this publication, the ministry has produced several other booklets to assist those responsible for developing play facilities and programs for children.

For more information, contact the Ministry of Culture and Recreation office in your area or write directly to the ministry's Resource Centre, 9th Floor, 77 Bloor Street West, Toronto M7A 2R9.

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